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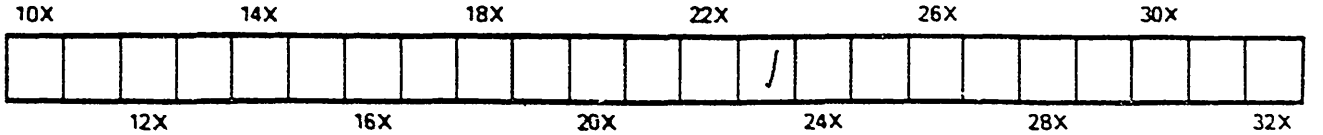

AGRICULTURAL JOURNAL,

AND

TRANSACTIONS

OF THE

Lower Canada Agricultural Society.

Vol. 5. MONTREAL · OCTOBER, 1852. No. 10.

We confess we feel some anxiety to know what measures may be adopted by the Provincial Parliament, the present session, in regard to agriculture. We hope for much, certainly, and, perhaps, more than we could reasonably expect, but for such an important interest we could scarcely expect too much, particularly when measures that were necessary have been so long delayed. We do not say that agriculture has been altogether neglected, but we conceive that more direct means of instruction in the science and practice of husbandry should have been provided long ago for the rural population of Lower Canada. The annual appropriation to Agricultural Societies by the Legislature was unquestionably productive of much good, but something more is wanting for the instruction and encouragement of that portion of the rural population who are not thoroughly acquainted with the practice of good husbandry. It is also all important to make agriculture more respectable in general estimation, and this can be best effected by providing regular instructions for communicating the science and practical art of agriculture to our youth. We never can induce youth to regard agriculture as an honorable and useful occupation, when it is considered that the most ignorant laboring-man can practice it successfully without any education or regular training. Hence it is, that if a farmer considers any of his sons more talented than another, he will endeavour to bestow the best education upon him, and never think of making him a farmer. In the whole course of this education he never reads or learns anything that has the slightest reference to the occupation of his father and the remainder of his family. He necessarily must, by this course, despise agriculture, and think it much beneath the attention of a young man of such high acquirements. He imagines it much more agreeable and honorable to consume the products of agriculture, than to be employed in raising these products, either as a worker or a superintendent. For our part, we have learned at an early age to estimate agriculture very differently, and this feeling has "grown with our growth and strengthened with our strength," and through all chances, we prefer agriculture to any other occupation practiced by mankind. The history of agriculture in all countries, shows that improvements have resulted from the experiments and perseverance of educated men. We readily admit that those who have made experiments, and first introduced improvements, have not all been successful agriculturalists; but many of them have succeeded, and those who have not, it is easy to account for their want of success. In all cases where new plans and modes of cultivation are first introduced, laborers, as well as others, are prejudiced against them, and would be better pleased to see them fail, than endeavour to work them out successfully. This very frequently has been the cause of serious loss and disappointment to parties who have first introduced the most useful improvements. The want of perseverance, and perhaps, the neglect of something that was necessary to the successful working of the new plans, has also been the cause of failure. Others have seen the value of the plan proposed, and what was necessary to make it work successfully, and remedied the defect, and assumed to themselve the whole merit of the improvement, which the party who had, perhaps, been ruined, was really entitled to. To prove our proposition, we

could name a large number of noblemen and gentlemen who have been the most useful agriculturalists that ever existed, and who have been the first to introduce improvements in cultivation, and in live stock. Our motive in introducing this mode of reasoning, is to show the value of education, in practical agriculture. In addition to education, a proper training and instruction in the practical art of agriculture, would enable educated men to engage themselves in the business without incurring the risk of loss and disappointment. We do not propose expensive establishments for this purpose, but that a fair experiment should be made upon a small scale, and if the whole machinery is put into proper order and worked judiciously, we are convinced it will prove successful and a vast benefit to Canada.

It may be replied to us that the Lower Canada Agricultural Society did try a Model Farm, and gave it up at the end of the first year. This is true certainly, but it must be recollected it was a farm offered to their acceptance for one year, until it would be ascertained whether the Government would grant any funds for the establishment, and nothing was done upon it except the ordinary work of the farm, as it was determined before it was many months in the hands of the Society to give it up to the proprietor at the end of the year. There was a numerous stock of neat cattle upon it that were not suitable for a Model Farm, but the Directors did not wish to change any of them, supposing it might not be agreeable to the proprietor to have any change made, under the circumstances of the farm coming back to him at the end of the year and his obligation to return to the Society the money placed in his hands as Treasurer of the establishment. The experiment, therefore, was not even commenced and cannot be said to have failed. It would not in any case be expedient to establish a Model Farm and School upon land only held on lease, for a short term of years. It would be hardly possible to find a farm to hire for a few years that would have suitable buildings for such a purpose, and it would be absurd to expend money upon the property of another party on a short lease.

An explanation with regard to the Model Farm at La Tortue may be necessary, and it should be understood that it was not a selection made or thought of by the Lower Canada Agricultural Society. The proprietor made an offer of the farm to the Directors of the Society without any application on their part, and they accepted the offer considering, it then a favorable one, but onthe conditions we have already stated, and the farm is now given up. If Model Farms are to be established, it should be on property belonging to the Government or to Agricultural Societies, so that any permanent improvements would be adding to the value of the property, and these improvements should be of that description that would be suitable for the farm in proportion to its extent, and it would be very inexpedient to expend a large amount of money on buildings, but care should be taken that the buildings should be constructed upon the very best plan, so as to be a model in convenience and suitableness as farm buildings. Every thing about the Model Farm should be economical and perfect as possible. A large expenditure would be one of the greatest objections to such an establishment, as this would be the means of causing farmers to reject it as a model, and very properly.

ON THE ADVANTAGES OF A SANDY SOIL FOR THE PURPOSES OF A FARM OR HORTICULTURE.

BY E. J. LANCE.

(*Continued from page* 116.)

THE lectures that were given by Sir. H Davy, before the Board of Agriculture, between the years 1802 and 1812, first drew the attention of the agricultural public to the very conspicuous position which the earth silex, assumes in the structure of vegetables.

In the preface to his published lectures of the year 1827, he says—" My object has been principally to dwell upon practical principles and practical applications of science; and it is in the farm and not in the laboratory, that these can be put to the test of experiment, and my duties and pursuits have rendered it impossible for me to do more than point out the path of enquiry."

Sir H. Davy, has, therefore, been our leading star, has led us to those enquiries and prin-

ciples that are now our guide: he it was who pointed out the similar appearance of the epidermis of reeds, corn, and grasses, and showed that they contained much silex. He burned them carefully and analised their ashes, and found that they contained the silex in rather a larger proportion than the canes.

All corn and grasses contain sufficient potash or soda to form glass with their ashes; hence, a corn or hay-stack, when burnt, gives the appearance of masses of black glass, in all those positions where the air had been in some measure excluded.

Globules of glass have been made with the straw of corn.

The experiments that have been instituted have fully convinced us of the necessity of there being a proper proportion of silica, and of potash or soda, in all soils. A white glass sand, being merely particles of abraded quartz, would not be so efficacious for vegetation, as a sand with a colour, because that colour is likely to be caused by the oxide of a metal in union with an alkali.

In the French Academy of Science, papers have been read recommending the use of sand as a dressing to arable land, on the ground that the silicious principle is the most predominating earth in all good land. M. Chaptel found more than half silicious matter in a fertile soil on the banks of the Loire. Gisbert found 79 per cent. in the most productive lands near Turin. Sir H. Davy found 89 per cent. of sand in the best barley and turnip soil, at Holk-ham, Norfolk. Liebig found 64 per cent. in a soil that had produced 70 crops of corn without manure.

The fertility of a soil consists of a happy mixture of earths, of which silex should constitute about three-fourths; beyond this proportion its capabilities for the production of certain vegetables, much depend on minute properties—admixture of acids and alkalies; but a light soil will, with little aid of the surface movement, enable the air and water to reach the roots of plants; these necessary and universal foods must reach the extremities of the roots: a continual movement of the surface assists this object—the oxygen of the air and water being as necessary for the success of plants, as it is at the first germination of seed.

On many occasions I have pointed out the fact, that barley and oats, in their straw, take the largest proportion of silex from the soil. Sprengel, in his analysis of straws of the cereals, has given us the following proportions:—oat straw, 4,588 lbs. out of 5,740 lbs. of fixed ingredient. Barley straw, 3,856 out of 5,244 lbs. fixed matters. Wheat straw, 2,870 out of 3,518 lbs. and of rye, 2,297 lbs. from 2,793 lbs. of fixed matters. Next to these cereals come the pea straw, which has 996 lbs. of silex from 4,971 lbs. of fixed matters. Thus it would appear that those crops succeed best is a very silicious soil, which take of the largest proportion of silicious matters: thus oats and peas are the best for such soils.

It is also found to agree with practice that, as all bearded corn require much silex, so will bearded wheat, barley, and rye, prosper best in such soils.

It is a good practice in light soils, after the surface has been prepared fit for the seed, that a press drill be used to form the seams for the grain to fall into; this gives a firm hold for the first rootlets, as they cannot well vegetate in cave like cavities; and after the seeding, a harrowing and a light rolling completes the work. But if rain succeeds immediately after the rolling, this latter process had better be omitted, for a light soil is apt to get too close on the surface, and prevent the admission of air to the germination. The advantages of press-drilling and rolling can only be for the breakage of clods, and for the keeping in the moisture—preventing the sun's rays from absorbing the moisture too rapidly. After the roots have got well set in the ground, hoeing should be attented to, for the purpose of admitting air and moisture to the splongets of the roots; thus would the aqueous flow, after a hot day, pass to the roots: and this always occurs if the nights are cloudless.

A deep hoeing can always proceed with success in all light soils, which are also best calculated for all horse-hoe husbandry processes. A light soil is also best calculated for spade cultivation, and for all wide drill cropping, enabling the cultivator to be continually working between the rows, admitting the oxygen of the air to the roots.

Dibbling and drilling seed, transplanting any of the brassica tribe, is best executed in a light soil. The more distinct the roots of corn, or any vegetation, is placed, the more uniform will be the crop, the more will they generally ripen together;—each root would then have its own share of food from the earth and from the air; thus situated they would not rob each other; crowded roots become barren from their contest for mastery—the most healthy will get the greatest share.

Corn that it set close and in a poor soil, will be ill corned and spindling; the roots has to go deeper for nourishment, and a continued contest will be the result if a sufficiency of air and light are not allowed to each plant and root.

To show the advantages of a light open soil, I need only refer to the fact brought to light by Professor Liebig,—that each shower of rain brings down with it the fertilising material of carbonate of ammonia; hence the necessity of the surface being kept in an open state, to receive these bounteous gifts of Providence. On this head, I cannot quote from a better or more recent authority than that of *Morton's Cyclopedia of Agriculture*, under the head of *Atmosphere*. —"Another important constituent is carbonate of ammonia; the presence of which in the air had long been suspected, but has only recently been proved. Rain water, which washes the

soluble ingredients from the air, brings down with it this salt in variable quantity, the proportion being larger in dry than it wet weather, and in summer than in winter. The rain of thunder-storms is always the richest in ammonia, and not unfrequently contains nitric acid, which is produced by the action of the lightning on the constituents of air. The quantity of ammonia in air has not been ascertained with precision, but there are grounds for supposing that one-eighth grain of ammonia is present in 21 cubic feet of air, or from one-eighth to one-fourth grain in a pound of rain-water. The ammonia found in rain water has always the characteristic smell of perspiration and animal excrements, from the decay of which it has been sent into the atmosphere. Carbonic acid, ammonia and water, are the substances from which vegetables mould their organised forms: and, hence, they are of great importance to the farmer, but not more so than the physical properties of the air itself, the medium in which all land animal sand vegetables exist. These, therefore, must be studied in their relations to agricultural practice."

A deep sandy subsoil allows the roots of plants to penetrate in search of food and moisture, when they cannot get the necessary supply from the surface. A carrot has been known to go down eight feet after nourishment; hence a sand is best for all tap-rooted plants. A good depth of loose earth will enable the roots to get a supply of moisture by capillary attraction; the superabundant moisture, in rainy seasons, passes down into the loose soil, and comes up again when wanted by the action of the sun's rays and the attractive power of the roots. Tap-rooted plants, like worms, bring up from the depths below fertilising materials for the surface; there they combine with the carbon of the atmosphere on the surface in the shape of leaves, were they decay, and form the vegetable mould, or humus, which gives colour to the surface soil.

The capabilities of a grain of corn are most wonderfull: it may be set in a well-prepared light soil in the early autumn, the root may be parted in a month into two or three roots; these again parted before the winter, and again parted in the early spring, eight roots thus produced from one, was by me made to yield straw six feet high with 190 ears of corn, which, at 70 grains to each ear, would be a produce of more than 13,000 grains from one.

These specimens were, for many years, exhibited by me at the Gallery of Practical Science, Charing Cross, London. I have also exhibited lately, at the Politechnic Institution, Regent-street, a root of wheat which has 90 straws.

Such is the capability of a single grain of corn in a light sandy soil, when the necessary food is supplied.

POTATO DISEASE.

The Earl of Malmesbury, H. M. Principal Secretary of State for the Foreign Department, transmitted to the Council, through Mr. Addington, the M. Consul-General at Warsaw—

Warsaw, "May 13th, 1852.

"Although the kingdom of Poland has suffered comparatively very little from the blight of the potato plant, which has of late years been so general in the more western countries of Europe, everything relating to that still unexplained phenomenon has nevertheless received much attention here from private individuals as well as from the public authorities. With the exception of Ireland, there is, perhaps, not another country in which the culture of the potato forms so important a feature of the rural economy of the nation as it does in Poland, although its introduction into this country is of comparatively recent date; and much public attention has lately been excited here by an article extracted from a foreign provincial newspaper, ascribing the so-called 'potato disease' to the presence of too much *free* ammonia in the lands on which the *plants are cultivated; and pointing out the very* simple means of counteracting this evil by the employment of fixed alkalies. This theory appears so strongly to bear out the view which was taken here of the subject at the very beginning of the epidemic appearance of the evil in question (as reported in my letter consular, No. 28, of the 16th October, 1846), that I am induced to bring the statement to your Lordship's notice, for the information of such persons as may be specially interested in ascertaining the correctness of the observation. I have not seen the original statement; but the article above alluded to mentions that it is copied from the 'Kolnische Zeitung,' to which it had been communicated by a Dr. Voget, of Heinsberg, in the Governmental District of Aix-la-Chapelle. Dr. Voget recommends as the most simple mode of decomposing the free ammonia, wherever by chemical tests it may be proved to exist, and whether arising from artificial manures or from natural causes inherent in the quality of the soil, to use crude gypsum as a top-dressing, or to irrigate the ground with very strongly diluted muriatic or sulphuric acid, in the same manner as liquid manures are applied, or before carrying out the manure to mix it with gypsum, ashes, or acids, &c.

"(Signed) GUST. DU PLAT,
"H. M. Con.-Gen. in Poland."

A WEEKLY COUNCIL was held in the Society's House in Hanover Square, on Wednesday the 19th of May, Colonel Challoner, Trustee, in the Chair. Professor Way, the Consulting Chemist to the Society, delivered before the Members the first of his proposed lectures on the light thrown by the agricultural principles of the celebrated Jethro Tull on facts connected with modern cultivation.

Prof. WAY stated that his object in the present lectures was to call attention to the principles enunciated by Jethro Tull fully a century ago, and to make such quotations from his work as would seem most forcibly to illustrate his views and the arguments by which they were supported. In doing so Mr. Way wished it clearly to be understood that he was not advocating any system or practice founded upon those principles, but simply of pointing out how far the ideas of an author who wrote almost before the dawn of modern chemical science, were compatible with the facts and laws which have been since recognised and established. As might be anticipated, wherever Tull attempted any scientific explanation of facts, the terms he employed were antiquated and obsolete—in accordance with the vague and fanciful theories of the older chemists and physiologists but utterly inconsistent with the present state of these sciences. Still, in the midst of all these crudities there might be seen a large amount of philosophical reasoning; and those who carefully studied the writings of Tull would find that many of the discoveries in agricultural science which are accorded to philosophers of the present day, were more or less clearly anticipated and announced by the author in question. Cobbett, to whom we are indebted for the most convenient edition of Tull's book, takes occasion in his preface to pay a deserved compliment to the excellence of its contents, and to remark that the re-publication of the work would strip many modern agricultural writers of their borrowed plumage. The great principle of Tull was, that the soil and the air together contained all that was necessary, without the aid of manure, for the production of luxuriant vegetation; but that, in order to render the one and the other available for this end, it was neccessary that the soil should be opened up by abundant pulverization and comminution of its parts.

The arguments with which this view was sustained were most forcible and convincing. The better to illustrate his meaning, he had compared the parts of the earth to which the roots of plants attach themselves with the grass or herbage on which animals feed. Thus the fissures or openings through which the roots penetrate, and the internal surface upon which they spread their delicate fibre, constitute, in Tull's language, the "pasture of plants"—a most happy expression, and one which facilitates in the mind the comprehension of his subsequent reasonings. So, then, as an animal will grow and fatten according to the suitability in quality and sufficiency quantity of the food to which it has access, in the same manner the rapidity of growth and the luxuriance of a plant will depend upon the nature and abundance ot the "pasture" provided for it in the recess of the soil. But the pasture of plants differs from that of animals in this important respect—that whilst in the atter case the quantity can only be increased by taking in more surface, the pasture of plants may be indenfiitely extended and renewed by pulverization of the soil, which is constantly exposing new surfaces to the roots. Nothing can be more true, as Tull says, than that for all practical purposes the soil is infinitely divisible: and that since the rooots of plants cannot by possibility occupy every interstice which may exist in a highly comminuted soil, each additional stirring is tantamonnt to the production of a new internal surface, and a fresh source of food. Then he argues that constant comminution and opening of the soil not only enables the roots of plants to benefit by the stores of food already existing in the soil, but that it at the same time materially increases the stock by letting in the atmosphere loaded with invigorating and he ulthful supplies. It is obvious that Tull could have had only a faint notion of the changes in the nature of the soil which might be brought about by the influence of the air and we can imagine the pleasure he would have derived from the acquisition of the more exact knowledge which in relation to this point we now possess; but none the less was he convinced that such an influence was exerted, and one of the objects of his method of cultivation was to take full advantage of it. Acting upon these principles, Tull had introduced a system of cultivation of crops planted in rows by the drill, and had earned thereby the gratitude of posterity, which was exhibited in the almost universal adoption of that system. But he had also attempted a method of growing crops which had not been so generally followed. In addition to the provision for stirring the soil between the rows of plants, he had left intervals of varying but very considerable width, between every second or third row, which enabled him at all times of the year to carry out his principle of pulverizing the soil. These intervals were in fact in the position of a naked fallow for the year, and were, in the succeeding season in their turn brought under a crop. Mr. Way did not intend to enlarge upon the practical part of this subject, which many of his hearers understood far better than himself; but he wished, irrespectively of any particular form of accomplishing that end, to impress upon them the great importance and value of a thorough comminution of the soil, both as rendering available its present riches and enabling it to receive from the air whatever beneficial effects the latter was able to produce. Mr. Way read a number of passages from the author's work, commenting upon and explaining them as he proceeded, and concluded his lecture by commending the book to the careful study of all those who had not yet become acquainted with it.

LORD BERNERS had great pleasure in proposing a vote of thanks to Prof. Way for the interesting lecture he had then delivered, which would be useful in pointing out to practical men the causes of their success or failure in particular cases.

Every farmer knew that the clay placed below a manure-heap increased its value and quantity. There was no description of land that was not benefited by green crops. He had some land so foul, that he had ploughed down the mangold on it, and found the wide spaces yield from 9 to 15 tons per acre. He had more wheat on strong land than on simple fallows.—Mr. Rowlandson had never greater pleasure in his life than in seconding the vote of thanks for the lecture they had just heard, and which he considered did great credit to Prof. Way, and proved the practical uses of funds appropriated by the Society to scientific purposes. He had himself been engaged in chemical operations on a large scale, and he could particularly estimate the value of one of the facts adduced, which would revolutionize the plan of processes connected with it, namely, the constitution of the double silicates, and the superiority of lime as an active convertible agent. It would have been thought, under the old system, that the soda-compound was superior. He conceived that the theory of Prof. Way would open views of unexampled importance in reference to the promotion of fertility in soils. It was probable that, if the double silicates could be obtained economically, direct manuring with the double silicate of lime might eventually be adopted as preferable to marling and liming. He remarked that the double silicates of alumina and lime formed a considerable portion of hydraulic cement, and might probably be manufactured on a large scale.—Colonel Challoner thought that these lectures, as delivered by Prof. Way, did a great deal to establish that intelligent principle of farming which led at every step to the inquiry "why" such and such things should be done by him. He considered that the Council had acted very wisely in their arrangements for the lectures to be delivered from time to time before the Members of the Society.—Mr. Evelyn Denison, M. P., inquired the condition of pulverized and burnt soils, and the power of the latter to absorb ammonia.—Prof Way remarked that although by burning soils their staple was destroyed, such soils were improved by the resulting pulverization. Clay was mechanically improved by being burnt, but it could then only absorb ammonia mechanically as a porous substance, the hydrated double silicates having lost by heat their properties of absorbing that alkali, and clay, when burnt, was accordingly deprived of the power of chemical absorption dependent simply on the action of these silicates.—Mr. Chandos Wren Hoskyns then gave an interesting account of his personal visit to the crops of the Rev. S. Smith, of Lois-Weedon Vicarage, in Northampton, the best experiment as Prof. Way had just then described him, of the Tulli an system of cultivation, and the author of a paper "on the experiment and experience of the growth of wheat year after year on the same acre of land," in the last volume of the Society's Journal, page 133. His results, as Mr. Hoskyns remarked, were only so wonderful, that they did not receive the credit they deserved: although, when personally inspected, they carried at once a conviction of their perfect feasibility, notwithstanding the marvellous absence of all manure, as technically so understood by such term in the carrying out of his simple, but effective processes.—Mr. Gadesden could fully confirm Mr. Hoskyn's statement, as he had also paid a personal visit to Mr. Smith's farm and inspected his crops. The soil was a stiff one and so stiff, that Mr. Smith's own tenant farmer, expostulated with him in reference to the circumstance: but although no manure had been used, it became so fertile, that it would be necessary to cast off the top staple and bring up the clay. Mr. Smith had 6 acres of wheat, and intended to extend the cultivation to 20. He understood, too, that the Earl of Essex had 50 acres on the same system.—Mr. John Mainwaring Paine, of Farnham, could simply but entirely confirm all that Mr. Hoskyns had stated with regard to Mr. Smith's experimental wheat-fields, under the Tullian mode of culture as practised by him. He would, however, very briefly state what he saw, and the impression which Mr. Smith's crops left on his own mind. The first time that he saw them was immediately after inspecting Mr. Lawes experimental wheat at Rothamstead, about the last day in June. He had thus a good opportunity of forming a comparison of the appearance of the respective crops at that time. Mr. Lawes's highly manured nitrogenous plots were then looking splendidly well: Mr. Paine had also some of his own similarly manured, which was likewise very promising, and which did realize from 7 to 7½ quarters per acre. He had thus in his mind's eye some very good standards of comparison, and he was bound to state that Mr. Smith's far exceeded either of them in luxuriant appearance and promise of crop. When he first beheld them, he could not help exclaiming "This land has been lavishly dressed with ammoniacle manure." And, so indeed, it really had been, from atmospherical sources; for this we knew, and could appreciate, after Mr. Way's most valuable discovery of the absorption and retentive powers of clay soils. Mr. Paine felt assured that there could be no mistake about this matter. The nitrogenous aspect of the whole crop, in his opinion, stood out in too bold relief to be overlooked for a moment. He was particularly struck with the largeness and regularity in size of the ears of the corn, and with the uniform height of the straw. This he did not expect to find; yet such, he remarked, was the fact. On asking Mr. Smith to explain the cause of this remarkable feature in thin-sown wheat, he replied that he believed it simply to arise from the circumstances of early sowing, by which means the plants were enabled to tiller out before the spring. These appearances, and the subsequent large crop obtained by Mr. Smith. Mr. Paine, need scarcely state

after what Mr. Smith had explained fully in his pamphlet as obtained exclusively by deep and frequent stirrings of the soil. His method was founded on Tull's principles, and was a great improvement on Tull's practice. Mr. Smith's intervals are smaller: there are three rows instead of two, and he digs down deeply into the subsoil, which Tull was afraid to touch. Mr. Paine considered Mr. Smith's practice to afford a most beautiful illustration of the large amount of ammonia available for agricultural purposes existing in the atmosphere, and at the same time of the absorptive power of clay or loamy soils. He had seen Mr. Smith's crops again this season: they were as remarkable for their luxuriance as last year, probably more so. There was no sign of exhaustion in the field then cropped with its seventh successive growth of wheat; but, on the contrary, there was some danger to be apprehended from its exuberance. There was evidently an accumulation of atmospherical and disintegrated mineral manure in that field, for an explanation of which Mr. Paine thought we must fall back upon the information Mr Way had given us relative to the absorption, retention, expenditure, and consequent balance of manure left in the soil. Mr. Paine could perceive nothing peculiar in the geological structure of the land at Lois-Weedon which would lead us to infer that Mr. Smith's success was at all attributable to that cause. It was manifestly what would be good wheat land, when well drained and well cultivated. With common management, the surrounding land did not produce large crops. In fact, Mr. Paine remarked, it was well known, that many trials of the same plan were then proceeding elsewhere, in different counties, with every probability of similar success wherever the land possessed the necessary ingredients of clay or loam. At that time he was himself carrying out this system on one of his fields; the surface soil of which was an extremely stiff clay resting upon a subsoil of the lower chalk marl; he having selected the field in question because it had already borne three wheat crops in the four preceding years. It was sown with wheat in the winter preceding 1848, the land being at that time in a good state of cultivation, the crop was an extraordinary fine one till it fell, and then it only produced about six quarters of a bad quality per acre. It was sown in 1849 with wheat, again without any manure; the result was 5½ quarters of good wheat per acre: all through the season the flag and straw had a very light green appearance, evidently showing the want of ammonia. There was clover in 1850 cut twice, and without any manure; and in 1851 it was again sown with wheat and manured with guano. The result was a crop of upwards of seven quarters per acre, weighing 65lbs. per bushel. Immediately after last harvest the field was deeply ploughed and cleaned from weeds, in preparation for Mr. Smith's plan; but for want of the requisite implements it was not sown till the 9th of November, at the rate of half bushel per acre, without any kind of manure: it looked thin and miserable through the winter, so that the intervals could not be trenched up till the middle of March. The ground was then broken eighteen inches deep, and some of the subsoil brought to the surface. The rows of wheat have been hoed, and the intervals deeply stirred up to the present time. The whole field had at that time a most luxuriant appearance, the flags of a dark green colour, and, like Mr. Smith's, if there be any fault, Mr. Paine's crop was only looking too gross in condition than otherwise.—Mr. Denison, M.P., inquired as to the levelness of all the ears of wheat in these cases, and referred to the objection sometimes made that when wheat tillered much many of the ears never attained perfection.—Mr. Alcock, M.P., required a statement of the profit and loss on this plan of cultivation.—Mr. Briscoe referred to its conexion with spade husbandry.—The Earl of Essex remarked that all his work was done by spade, and no difficulty was experienced.—Mr. Wolryche Whitmore stated the results of his own experience in deep cultivation on his estate i Shropshire. The effects of trenching a piece of garden ground three feet deep, and leaving it without manure, were so wonderful, that strangers on witnessing these effects could scarcely be persuaded that the ground had not been heavily manured. A portion of the arable land too, on one of his farms, was plonghed twelve inches deep, and the remainder was only ploughed shallow: the result was, that while the deep-ploughed land was most luxuriant, the shallow was so indifferent that he did not know what to do with it. He then cited the results of Mr. Woodward's farming in the Vale of Evesham, and Mr. Randall's opinion that dry ground should be well trodden with horses in the early spring. They were all well acquainted with the pulverizing and consolidating power of Crosskill's clod-crusher: still he thought that a medium should be observed in these operations, and that pulverization especially should not be carried too far; the market-gardeners, he believed, having ceased to pass their soil as formerly through a fine sieve. —Mr. Chandos Pole recollected an instance on his own property of the result of great consolidation from trampling. In the November of 1850 the whole of a pack of hounds had run through the same gateway of a wheat-field. The soil at Radbourne, as those would remember who were present at the trial of implements at the Society's Derby Meeting, is a remarkably strong one, and the ground near the gateway in the line of these runs was trodden down as hard as a table: it was thought, accordingly, that the wheat would fail in this part of the field; but on the contrary, it was found before reaping that it had become the best part of the whole crop.—Mr. Whitmore remarked that he had gone to twelve inches deep.—Mr. Paine stated that he had proceeded to twenty inches, and had found that the deeper he went the better crops he obtained.—Colonel

Challoner referred to the different mechanical condition acquired by the particles of soil in the process of sifting.—Professor Way thought nobody could doubt the value of consolidation after pulverization. In these, as in all other cases, no truths could militate against each other, while errors might. The lighter soils were those to which consolidation was most applicable; heavy soils required pulverization before consolidation. Mr. Smith, he believed, preferred a solid bottom to his land. Perfect manuring was obtained from the air: in fact, that clay itself manured itsef.

The vote of thanks to Professor Way for his kindness in delivering the interesting and important lecture which they had then heard, was then put by Colonel Challoner from the Chair, and carried unanimously; Professor Way, in acknowledging the compliment expressing the satisfaction it gave him on that and on all other occasions to aid in the great work of promoting the objects of the Society.

A WEEKLY COUNCIL was held at the Society's House in Hanover-square, on Wednesday, the 9th of June, Mr. Raymond Barker, Vice-President, in the Chair. Professor Way, the Consulting Chemist to the Society, delivered his concluding Lecture on the agricultural principles of Jethro Tull, illustrated by modern facts.

Prof. Way's object in this second and concluding lecture was to examine how far the views and principles of Tull were consistent with the modern discoveries of agricultural chemistry. Plants consisted of certain organic and mineral elements, the nature of which was now well understood. The question was, could these substances be supplied by the air and by the soil without manure, as Tull supposed? It was pretty generally conceded at the present day that carbonic acid, ammonia, and water, together, were capable of furnishing all that was necessary to build up the organic structure of plants; whilst no soil of ordinary fertility would be found, upon examination, to be absolutely deficient in any of the mineral ingredients that were required by vegetation. The air contained both ammonia and carbonic acid, but it might be open to question whether in sufficient quantity not merely for a *natural* but for a *forced* production of wheat and other crops, such as alone would suffice for the wants of a populous community like that of this country. The quantity of carbonic acid in the air had been found by repeated experiments of M. Saſeure to amount, on the average, to a thousandth part of its weight, and Liebig had calculated that at any one time there was in the air as much carbon in this invisible form as would suffice for the production of the whole coal fields existing throughout the world. It required no stretch of the imagination, therefore, to suppose that with the air constantly in motion, and constantly renewed to the roots of plants, they might receive from this source all the carbon which was required for their growth. Whilst, too, every desintegration of the soil gave access to this carbonic acid in larger quantity for the direct supply of food, directly contributed to the sustenance of plants by rendering available the necessary mineral elements of their food, which water impregnated with carbonic acid was capaple of dissolving. With regard to the quantity of ammonia in the air, we did not possess such satisfactory information. Of its existence there, no one entertained a doubt; it was produced by the decay of animal and vegetable bodies, given off in the exhalations of living animal bodies, and probably in the sweet perfumes of flowers, and thrown out in certain parts of the world in immense quantities by volcanoes. But to ascertain the proportion of ammonia in the air was extremely difficult, and although it had been attempted by more than one able experimenter, the results must only be looked upon as distant approximations to the truth. Fresenius, to whom the most careful experiments on record in regard to this matter are due, found that 1,000,000 parts by weight of air contained 0.133 parts of ammonia. Without stopping to examine the probability of these figures representing the average amount of ammonia in the air, we might ask whether such a quantity would suffice for the wants of an abundant vegetation. This question it was impossible to answer. Mr. Way's own recent investigations had brought to light the existence in the soil of certain double silicates possessing the power of abstracting the carbonate of ammonia from the air with as much avidity as if they were strong acids. A good soil, well opened by cultivation, would therefore be constantly at work, day and night, collecting ammonia from the air; and the quantity that could be so obtained would only be limited by the frequency of the renewal of better air. Of course we could not say how often this would take place; but what with alternations of temperature, differences in the heat of the soil and the air, the influences of wind, and perhaps also a constant interchange in the particles of air themselves, it was evident that the renewal of the air in the soil, and the consequent acquisition by it of ammonia, might go on to a very great extent. And it was worthy of remark, too, that this collection of ammonia by the soil was quite independent of rain and dews, and was always proceeding. The more, therefore, the soil was exposed to the air the richer it would become. Of course Mr. Way spoke of soils containing a sufficient quantity of clay. Some light soils there might be that would be injured, not benefitted, by such exposure. Mr. Way went on to speak of the experiments of the Rev. Mr. Smith, at Lois Weedon, expressing the great gratification which he had experienced from a visit to that place. These crops of wheat, which were now growing on land which had been for six years under wheat without manure of any kind, looked as if they had received a dressing of ammoniacal salts: and that, indeed, was the fact, though the ammonia had been added not

directly, but *indirectly and from the air*, by the abundant cultivation which Mr. Smith's method enabled him to give. Mr. Way was of opinion, then, that, so far as the organic elements of vegetation were concerned, there was no absolute impossibility, but, on the other hand, every probability, that they might be secured in all abundance for large crops without manure, provided that the soil was fully exposed to the influence of the air. The only question that remained was in regard to the exhaustion of mineral matters by this mode of cropping. Mr. Way believed that the danger of mineral exhaustion in soils was frequently very greatly overrated. There was no doubt that the continuous cropping by wheat, or any other plant, without the return of anything in the shape of manure, would gradually but certainly reduce the quantity of mineral matter contained in the soil; but the quantities so removed were now accurately known, and it would be found that a continuous course of cropping by wheat for many years took from the land only a very insignificant quantity of these substances. The following table showed the amount of phosphoric acid, potash, &c., removed by a large crop of wheat in one and twenty years respectively, and in another column of the table would be found the *per centage* composition which the soil must have to yield them for twenty such crops.

35 BUSHELS OF WHEAT AND 2 TONS OF STRAW.

	1 crop.	20 crops.	Per-centage removed from soil by 20 crops.
	lbs.	lbs.	
Silica ...	171	3,420	0·152
Phosp. acid	30	600	0·027
Sulph. acid	8	160	0·007
Lime.....	16	320	0·014
Magnesia	10	200	0·009
Potash....	39	780	0·036
Soda.....	3	60	0·003
	277	5,540	0·248

The per-centage removed from soil by 20 crops, is calculated on the assumption that the soil is 10 inches deep and weighs 1,000 tons.

Those who had had anything to do with the analysis of soils would see that no soil of ordinary fertility would be found without a small quantity of those minerals here mentioned—indeed, it is usually the case that a loamy soil would contain from two-tenths and upwards of potash, and other things in proportion; and although the whole of this might not be available at any one time, the constant stirring of the land bringing into play the action, furnished a constant supply adequate to the wants of the plants. But although there might be no danger of exhausting the land by this system of cultivation, Mr. Way did not see what good reason there was for continuing it on the same land for more than a certain number of years—say seven or ten—and then alternating with other land which had been meanwhile under manure. In conclusion, he begged to say that, having shown as far as he was able the admissibility of the improved Tullian system on theoretical considerations, his duty was over: it was for practical men themselves to test thoroughly the merits of the plan, and to decide upon its ultimate adoption or rejection.

On the motion of Mr. Gadesden, seconded by Mr. Wolryche Whitmore, the best thanks of the Council were voted to Prof. Way, for the favour of this second lecture on a subject of so much interest and importance.

Captain Wentworth Buller, R. N., had visited the Rev. Mr. Smith's farm at Lois-Weedon; and he went to it as sceptical as a man could go. He was told that wheat had been grown for six years successively on the same land, and was informed of the application of labour to the several operations of the crop. He resolved, if possible, to pick holes in the system. He examined he thrasher and the labourers on the farm; he looked over the crops; but he was unable to detect any error in the statements made to him. Mr. Smith showed him his wheat, and the fields on which his average crops of 36 bushels an acre had been raised: his men corroborated his assertions. He ascertained the price of digging, and found that people could earn 2s. a-day. All the manure was applied to the green crops, which were as marvellous as the corn-crops. He had first a heavy crop of rye cut in April, then sweeds, and afterwards trenching. There was not too much or too little moisture. The roots extended to 18 inches. The crop being never checked, the straw, as in Mr. Hewitt Davis's system, was bright, from the vegetation not being retarded. Captain Buller had procured some of Clayton's three-pronged forks, 18 inches long, for the purpose of ascertaining what could be done on this plan. They were worked by day-labourers, at the common wages of the county. They dug 6¼ rods a-day of light, stony soil, thoroughly well, to the depth of 18 inches, at about 3d. a rod. He had been surprised at the amount, excellence, and economy of the work executed.——Mr. Rodwell, of Alderton Hall, had used the fork much on his own property in Suffolk. The forks were of the light spit kind, and the best were made in that county; they went to the depth of 18 inches, and turned the soil completely up. A thousand acres of land had been dug to that depth at from 2½d. to 3d. the square rod, for the purpose of taking up the chicory crop. The expense of this forking was from 30s. to 33s. 4d. per acre; and the labourers, during the winter months—from October to April—could earn from 10s. to 12s. per week.——Mr. J. Manning Paine being extensively engaged in hop cultivating, had his attention much directed to operations of the nature then referred to. He trenched at intervals, and every year dug 200 acres to a perpendicular depth of 18 inches. The cost was greater at the first digging. It cost him 24s. per acre to bring the bottom soil to the surface. It perhaps might be better to do it at two spits, in the same manner as Mr. Smith did, in which case it would

cost him 30s. per acre. The labourers can earn from 2s. to 2s. 6d. a day. He had found one-horse scarifiers the best for intervals. He had seen wheat crops on land well manured with ammoniacal salts, guano, and other substances, look poor and blighted; while those on adjoining portions of the same land—treated on Mr. Smith's plan, retaining in the soil an available stock of nutriment without being required to be manured for the current year—were looking remarkably well, and yielded 7½ quarters of wheat. By applying to the crop itself a large amount of ammoniacal matter, a great portion of it was lost for the immediate purposes of vegetation. In reply to an inquiry, stated that he had known ashes or burnt turf applied for carrots seven years ago.—Mr. Hammond thought the nature of the soil ought to be taken into consideration. He had paid 24s. an acre for trenching at 18 in. intervals. He considered that Mr. Smith's charge of £2 a load for straw on the credit side of his account was too much.—Mr. Gadesden remarked, that he was much struck with that part of the lecture where it was stated that so small a proportion of the inorganic elements of a soil are exhausted by cropping. The question of exhaustion was one that had been often raised against Mr. Smith's system. It appeared, however, that such exhaustion would be practically almost impossible, provided the soil was from time to time kept in a state of sufficient comminution. Professor Way had placed the subject in a new and clearer light. He had even said that it would be cheaper to supply manure than to go on growing crops without it. If, however, Mr. Smith's crops in this, their seventh year, were better than Mr. Gadesden's show-crop last year, and the profit of such system of cultivation should continue unabated, he himself could see no reason for its being abandoned; as no person would cease to cultivate profitably. The expense of cultivation, too, was rendered light by the implements which Mr. Smith employed, the principal of which was a single-horse scarifier that worked two lands at a time. M. Gadesden's operations being carried on in heavy land in Surrey cost him more money than Mr. Smith's at Lois-Weedon on a lighter soil. He had now 17 or 18 acres in cultivation under the new system; but the season had been particularly trying, and the autumn having been dry, the grain had lain long in the soil; he found the system a difficult one to carry out in such seasons. Mr. Smith's object, he believed, was to get the wheat to tiller before winter, not to be retarded till the spring. In wet weather the scarifier could not be worked.—Prof. Way replied, that he did not mean to say that the time would come when the system would be abandoned; but that it would be continued as long as it was found to go on profitably. He saw, however, no reason why manuring should not continue to be applied to green crops, and should only be omitted for wheat. There would be no harm in carrying on the system under the same circumstances for ten years. A time of improved mechanical appliances might supersede the use of manures; while, on the other hand, a cheaper source of ammonia might be discovered.—Capt. Buller remarked that as Mr. Smith's land was on the oolite, it might yield a larger amount of mineral matter to vegetation, while the climate was favourable, and the amount of rain small. He understood that Mr. Smith attached great importance to the effects of exposure to frost, and accordingly, that he turned up his land rough for the purpose of receiving the full benefit of that influence.—Mr. Whitmore hoped that the lecture they had just heard would be published in the Society's Journal, in order that it might, on account of its importance, receive the full attention of the members.—In reply to an inquiry by Mr. Baskerville Glegg, Mr. Thomas Smith remarked that if anything ruined fox-hunting it would be the winter-beans, which, October planted in lines five feet apart, yielded 7¼ quarters to the acre.—Mr. Rowlandson thought that in addition to the fertilizing effects of the system, a great deal depended on the time of sowing. It had just been said that wheat ought to tiller in winter. In eastern countries, when wheat tillered before Christmas, the hogs were turned into it. He considered that early sowing would be productive of great results: winter-sown oats in Surrey would return double. While acknowledging the full merits of Mr. Smith's operations, he was still of opinion that time of sowing was as important a point as the preparation of the land. Mr. Rowlandson regarded agriculture as the fasciculus of all the sciences, none of which can be neglected without in a certain degree injuriously affecting its operations; and however correct any science might be in itself, its application would lead to many errors, unless all the circumstances and bearings of each particular case were duly taken into consideraton.—Mr. Paine had just seen a crop, sown on the 9th of November, looking at the time as well as could be desired.—Mr. Rodwell thought that no stated rule could be laid down for the time of sowing, either in reference to the soils or climate of different parts of the kingdom. He knew soils in the same county and parish on which it would be unwise to sow in every case either uniformly early or late. He had gained the experience of a great many years on that point, but found that it was difficult to lay down any fixed rule on the subject. He might, however, venture to say that good lands were better adapted for being sown in October and sandy soils in December.—Mr. Gadesden observed that Mr. Smith had sown wheat on the 11th of September, that he was obliged the month after to plough up, in consequence of the grain having matted on the soil. Mr. Rodwell referred to the gradual modification of his practice of manure by the experience of successive years. When he first sowed corn, he applied to his land 20 loads, or 15 tons farm-yard manure to the acre, agreeably with the practice also followed at the time in the adjoining county

of Norfolk. He then gradually reduced his manuring to one-half that amount; afterwards to 20 loads in four years, applying it twice during that period at 10 loads per acre. He believed that if he could put on each year only five loads per acre, or still smaller quantities at shorter intervals, he should derive greater advantages than from a greater quantity applied at once.—Mr. Thomas Smith remarked that he believed it was the opinion of his brother that it would be best to go on at Lois-Weedon for a year or two longer on the present plan, and then to introduce roots crops into the system.

REMARKS ON FUNGI.

In all directions fungi is making havoc; that is to say, the fungi which produce the appearances popularly known by the name of blight, are showing themselves in force. Beans are so attacked by Uredo fabæ that farmers are ploughing them up; wheat is withering under the joint or separate infliction of the Uredos rubigo and segetum; Æcidium cancellatum is ravaging thorns and pear trees; Oidium Tuckeri is smothering vines: Erisiphes are overrunning the pea crops; and, as a matter of course, our old enemy, Botrytis, is once more a visitor to the potato grounds of Sussex. In all quarters to what would be their course of proceeding.

We fear there is no immediate remedy within reach; for sulphur, the only agent that has stood the test of experience as a specific for vine mildew, could not be applied on a large scale, and might not answer, even if it were applied regardless of cost. But, at the same time that we acknowledge our present helplessness, it may possibly lead hereafter to some result, if we can succeed in drawing attention to certain points connected with fungi and their manner of life.

The seeds of mildew or blight fungi appear to exist every where—dispersed through the air and lying in the soil. Drawn into the system of a plant with the water absorbed by roots, or possibly through the pores of the leaves, they are ready to grow wherever they find themselves in presence of matter on which they can feed, and in circumstances favourable to their development. Hence they appear every year in some degree, particular species infesting particular kinds of plants, just as each animal is preyed upon by vermin peculiar to it. The mildew fungi must be coæval with other created things; but they attracted little attention until the mischief produced by them became serious. It would seem that their abundance has been coincident with the march of cultivation; and it is an almost universal opinion that now, when horticulture and agriculture have arrived at a state of perfection unknown before, mildews too, are producing a degree of havoc to which there is no parallel. We believe that opinion to be well founded. Is the fact, if it be one, capable of explanation?

The injury inflicted upon crops by fungi is owing to the action of their mycelium or spawn, a cobweb-like substance of extreme tenuity, which escapes observation, in consequence of its being buried in the tissues beneath the skin of a plant. The mycelium constitutes the larger part of all fungi, and is so much alike throughout the entire race, that it is a fair inference to assume that the ascertained habits of some species correspond with the habits of others that have never been examined, or which, from their nature, are perhaps unexaminable. Now, among the great particularities of the race are these, firstly, that they exhale hydrogen and nitrogen; and, secondly, that they abound in the latter element. Hence, they feed greedily upon water, which they decompose, and upon nitrogen, which they separate from substances with which it is in a state of combination. In the absence of damp, they refuse to appear, as is known to builders and dockyard men, who only find dry rot, the mycelium of fungi, on timbers in damp, ill-ventilated places. When a fungus which has sprung up in a meadow decays there, immediately the grass where it was becomes rank, and acquires that deep, blackish-green colour which indicates the absorption of nitrogenous matter. The phenomenon called a fairy rink, caused by the decay of fungi growing in circles, is a familar example of this fact. M. Marcet, of Geneva, in his inquiries into the respiration of fungi, obtained the following result:—

	Hydrogen.	Nitrogen.
Sphæria digitata gave off	 65	.. 33 in 10 hours
Agaricus ericeus „	 55	.. 44 „ 10 „
„ deliquescens „	. 70	.. 30 „ 8 „
„ physaloides „	... 57	.. 53 „ 2 „
„ leucocephalus „	.. 42	... 56 „ 6 „

So that it is fully demonstrated that hydrogen and nitrogen are most abundant elements in the composition of fungi; and it seems a fair inference that they will abound, on the contrary, in proportion to the supply they may find of these gases.

When a tuft of wheat is accidentally in contact with manure, it grows dark-green and rank, and is invariably mildewed. When a bush, a rose, makes stout watery shoots, in consequence of strong manure applied to its roots, or from any other cause, those shoots are sure to mildew. In like manner the watery wood of peaches is the first to exhibit signs of disease connected with fungi. The evidence obtained in the long inquiry made into the potato disease all went to show that rich manures and wet soils were among the most certain causes of that terrible malady. In each of the instances now quoted, water yielding hydrogen, together with nitrogen, existed in excess. There is a firm belief that fungi appears in abundance after thunderstorms; the Irish maintained, in 1845, that in all the north of their island the potato disease broke out after vivid lightning: botanists often call fungi "meteoric" plants. These circumstances may be applicable with reference to an excessive quantity of ammonia (a source of nitrogen), produced in the air during storms, and brought down in rain.

On the other hand corn is never, we believe, mildewed extensively in dry, unmanured land. The small, well-ripened wood of roses and peach-trees suffer little from mildew. Potato disease was scarcely felt, in the dry, hungry sands of England, and always produced least injury where no manure was employed. Gardeners find no mildew upon the hard, short-jointed bushes which they force into abundant flower with so much skill. In these cases the quantity of water is reduced to a minimum, and supplies of nitrogenous matter are wholly withheld, or very sparingly applied, in the form of weak liquid manure.

It becomes, then, a question whether the alarming prevalence of mildews may not be traced to our high cultivation, and whether we ought not to seek for the means of increasing our crops by other means

than the excessive application of ammoniacal manures. That question we venture to put to our readers, and we hope to receive an abundance of well-considered communications upon the subject, not advocating any particular view, but recording any ascertained fact on either side of the question. It is one of the deepest importance. If it should turn out that mildew does not prevail more extensively in highly manured land than in poor land, then we shall be able to proceed with renewed confidence in the application of ammoniacal substances. If, on the contrary, it should appear that mildew does in fact accompany in a serious degree the use of strong manures, then we must set about devising some means of dispensing with them.

We would more especially invite attention to this subject from the able author of the "Word in Season," a phamphlet, the interest of which cannot be overrated, and which is destined ere long to produce a great change in the system of both field and garden cultivation. We know that many persons of much intelligence regard the nameless author of this work as an amiable enthusiast, converting an instance of accidental success into a hobby-horse, which he is riding to death. But in that opinion we do not concur; on the contrary, we firmly believe that he advocates the soundest views of cultivation, and we confidently appeal to the gardeners who read this journal for confirming our judgment.—*Gardener's Chronicle.*

DISEASES OF PLANTS.

Continued from page 375.

We have here, then, the scource of many a disease, which may exist in every degree, from a slight constitutional derangement, up to such an aggravated form as must inevitably end in death. In the first stages, altered conditions may be able to cure the malady; and it is part of the skilful cultivator's tact and judgement to apply the proper remedy. In a state of nature, when disease is once set up, there is little probability of amendment, for plants are confined to the spot on which they grow, and have no powers of selection. The air is imbibed by the leaves, whatever be its quality, and the moisture by the roots, with whatever ingredients it may be mixed, or in whatever needful constitutents it may be deficient. And not only must the air be pure, or at least properly constituted for each especial plant, and the soil contain the right degree of nutriment in its just proportion, which will vary with the vegetable it is to sustain; but there must be the requisite degree of moisture, heat, and agitation from the winds, due access to light; and it is possible electricity—though this at present is matter of uncertainty—may have much to do with some of the more intimate operations of vegetation.

It may be well, however, to say a few words on each of these points separately.

1. And first, as regards temperature. If this be not within certain limits, it is evident destruction will take place. Too high a temperature, even where there is continued access to moisture, will produce a degree of excitement inconsistent with healthy growth; and at length, as it advances, dilate the tissues to such a degree that all vital functions will cease. If, however, the water caried off by increased evaporation cannot be readily replaced, and, at the same time, the surface of the soil be cracked to such a degree as to expose any great proportion of the more delicate fibres to a dry atmosphere, it is obvious that the foilage must wither, and the plant eventually die; and even where this has been the case merely for a time, the mischief is often so great that permanent disease is the consequence. A low degree of temperature, again, is equally destructive, by destroying the connection between the cells, so that the parts affected are no longer masses of intimately connected tissue, but, to a great extent, of completely isolated vesicles; and though different plants have very different capacities of resisting cold, and tissues an active state of growth are far more susceptible, probably from the more delicate condition of the membranes of their cells, than those of the same plant at a more advanced period, there is a degree which no vegetation, however hardy, can withstand. We have here, then, two very important causes of disease, though, perhaps, not always immediately apparent. If a large portion of the roots have been destroyed, it often happens that they are never replaced to such a degree as to restore healthy growth; and if, again, the juices with which the cells are gorged, have become inspisated, or the main ducts filled with gummy or resinous matter, as is often seen in trees abounding in gum or resin, another latent cause of disease has taken place, from which the vegetable may never recover. If, again, injury have been produced by cold, either to the partial or more extensive destruction of tissues, though any great derangement may not at once be apparent, after a series of years the evil frequently shows itself in the complete or partial destruction of the affected tree; that this is one, at least, of the causes of canker, can scarcely be doubted. Where partial destruction of tissues, by frost or other causes, has taken place, the remaining part has more work to do; it happens not unfrequently that this gives way; the bark separates from the young wood, exposing it to air, insects, and the attacks of fungi, and in trees abounding in gum there is soon external evidence of speedy dissolution. The disease thus established is, from its main symptom, known by the name of gumming. Exusion of gum and resin are not, however, always indications of disease. In certain leguminous plants, and many conifers, such exusions are common, and far from injurious, when not excessive. The cause of the very curious disease in conifers in which the whole tissues become completely impregnated with resin, causing the wood to be almost imperishable, is quite unknown, and a remedy is never dreamt of, as the wood, for many purposes, is far more valuable than in its ordinary condition. In diseased potatoes, an exusion of fecula from different points in their surface, to some extent, has more than once

been observed. This, however, must clearly arise from decomposition of the cellwalls, and the percolation of the watery contents highly charged with fecula, in consequence of the general contraction of the substance of the tubers. But not only is destruction produced by a too great elevation or depression of temperature, but a certain degree of temperature is necessary for the regular progress of vegetation. Seeds will not germinate without it; buds, again, require a proper degree of heat, after the winter's rest, for their development, and so on of other needful processes. Proper alternations of heat and cold too, are necessary, as well as a degree of temperature adapted to the exigencies of the several processes of growth, from germination to the perfect maturation of the seed.

2. Light, again, is a most important element in healthy vegetation. Without it the chemical changes necessary to the full development of the chlorophyll will not take place, and the plant is in consequence blanched. A gloomy season is in general unfavourable to vegetation. The susceptibility of plants for the agency of light varies also not merely with the species, but with the stage of growth. Some plants are naturally inhabitants of shade, and perish if exposed, and tender tissues frequently require protection from its too free admission.

3. Of electricity we can say but little. Experiments have not confirmed the assertions made as to its influence on rapid and vigorous vegetation. It is, however, so closely connected with chemistry, which plays so obvious a part in all vital functions, that we cannot doubt its importance. That it has a great effect on the growth of certain fungi, is all but certain.

4. We come now to material agents. The common medium in which plants live, and from which they derive important chemical constituents—the air we breathe, is the first to call attention. Its presence is absolutely necessary to the germination of the seeds, and to the healthy action of roots. But the air not only is the main source of oxygen and other gaseous matters, but, like a sponge, it contains vast bodies of matter attracted from the earth, as water, for instance, without which all vegetation must soon entirely cease. Many plants shortly perish except in an atmosphere highly impregnated with moisture; and there is great reason to believe, that in particular cases, as in the tropical forests, most unhealthy to man, certain vegetables find an atmosphere most congenial to their growth. The greater part, however, require a tolerably pure air, as we see from the difficulty of cultivating plants in large towns, arising partly, no doubt, from the large quantity of dust and soot constantly floating about, and deposited not merely on the surface of the leaves, but within the stomates, to the great hindrance of the grand processes of due respiration and evaporation; and also from the fact, so obvious to cultivators, that ventilation is absolutely necessary for successful cultivation. Partly from its agency in properly mixing the constitutent parts of the atmosphere, and partly, probably, from the agitation of the vegetables, themselves: wind, within certain limits, is generaly considered favourable to vegetation.

The trials which so often take place with respect to chemical works, prove most conclusively, apart from all prejudice, that any undue admixture of gases which either do not enter into the normal composition of atmospheric air, or derange its proportion to any great extent, are sooner or later fatal. The effects are visible enough in tender tissues to the scientific eye but after a few years, disease is established to such an extent as to prove materially injurious, and even extensively fatal.—*Cyclo. of Agri.*

TRIAL OF THE SCOTCH AND AMERICAN REAPING MACHINES.

The trial of Hussey's and Bell's reaping machines took place at Muirton Farm, within a mile of the city of Perth, on the last day of the exhibition of the Highland and Agricultural Society of England. From 10,000 to 12,000 were present. Great interest was excited by a new machine, invented by the Rev. Mr. Bell, of Carmyllie, 25 years ago, and which has been in use on the farm of Mr. Bell, of Inchmichael, Carse of Gowrie, for the last 15 years. The principle is the same in Bell's as in Hussey's but the details are essentially different. Hussey's machine on being put to work requires a clear space on the right hand of the standing corn for the horses to draw it. Bell's goes right into the corn at once, the cutting apparatus being before the horses. Hussey's may be illustrated by supposing two men drawing a scythe down one side and through a standing crop, with the handle for a pole; Bell's like two men cutting forward with a dutch hoe. When Hussey's machine takes the field one man at least is required to stand on it, and with a hand-rake throw off the cut corn for the gatherers and binders; Bell's machine is supplied with a canvass apron on rollers, rising at an angle of 45 degrees from the cutters, and worked by a concentric motion, so as to lay the cut corn in line to be gathered. Hussey's machine cuts the crop as it stands. Bell's has flying arms in front, which lay the corn to be cut exactly as a printing-machine lays hold of paper to be printed. Hussey's machine goes to work with a rumbling noise, Bell's in silence.

The first trial was by Bell's machine on a field of oats, in the presence of the judges. It went along very smoothly, and laid the corn with the utmost ease. The stuble left was about three inches high, and very even. Eight women and two men were scarcely able to gather it, which gives some idea of its speed; and the horses, two Clydesdale grays, seemed quite equal to their work. Hussey's machine was then tried. It cut two or three breadths

with ease and very speedily, but, getting to a piece of rough ground, by the furrow of the field, or the "rig" as it is called in Scotland, where the grass had grown about a third part up the straw of the oats, it got choked, and came to a dead stand. So far as it had cut here the stuble was very uneven, and the corn much spoiled. On being cleared, the rest of the breadth, if cut at all, was not a satisfactory performance. The second trial was on a field of barley. The late heavy rains had "laid" the barley in several places, and in some parts it was so twisted that but little hope was entertained that it could be cut by the one machine or the other. Bell's machine went in first, and cut a breadth very smoothly. Here the practical value of the arms became apparent. They laid hold of the crop so as to put the most twisted parts of it in order for the scissors, and when the breadth was cut, the stubble was as good as that of the sickle. Hussey's machine worked much worse among the barley than among the oats. It cut smoothly and speedily where the straw was straight, but whenever it came to a portion that was laid at an angle from the machine, the cutters missed, or tore the corn up by the roots, leaving a very uneven stuble on most parts of the ground. The third trial was on a field of wheat in beautiful order for cutting. Bell's machine mowed the strong stuble and laid it in order very freely for the first 20 yards, but it then got loaded with the cut corn and stuck fast. The canvass apron did not appear to have power or velocity enough to throw off the wheat as quickly as the cutters laid it on, and this deficiency in the working of the machine occasioned its coming to a standstill three or four times in the course of this trial. Hussey's machine went into the wheat with great ease and power. It was soon evident that its *forte* lies in cutting straight wheat on smooth land, while for oats and barley it is ill adapted.

Since the above was written, the following has been addressed to a Scottish contemporary by the secretary of the Highland and Agricultural Society of Scotland, on this subject:—

Dargavel House, Bishopton,
Aug. 16th, 1852.

Sir,—As the official repoit of the trial at Perth of Bell's and Hussey's reaping machines may not immediately appear, in consequence of the absence of some of the judges. I think it proper to advert, through the medium of your paper, to a misrepresentation, produced by the account of the trial, contained in the *Times* and other newspapers It has been erroneously represented that Bell's machine, though the best for oats and barley, comparatively failed with wheat. I am authorised, however, to state that, in the opinion of the judges, its superiority was conspicuous in reference to all the kinds of grain experimented on. I am, &c.,

Jn. Hall Maxw ell.

A FLOATING CITY.

By the time that we were fairly under weigh, and working towards the anchorage, the whole city of Bangkok, consisting of a long, a double. and in some parts treble row of neatly and tastefully painted wooden cabins, floating on thick bamboo rafts, and linked to each other in parcels of six or seven houses, by chains, (which chains were fastened to huge poles driven into the bed of the river,) rose like a magic picture to our admiring gaze. Junks of 1,400 tons were lying close alongside these floating cabins, so close that they could converse with each other with the greatest facility; and one vessel, a Portuguese that was working tack and tack with us up the river, approached so close to the houses, that in going about, she came foul with, and carried away with her, half a dozen of these floating domicles. The tide was running down rapidly, and, so soon as the brig disentangled herself, away went these houses at a steamer's pace, amidst the vociferous hootings, and shoutings of their tenants; and, before many minutes had elapsed, they had disappeared round a corner of the river, and were stranded on the opposite shore, but they sustained no great injury, for, with the simple difference that their dislodgement was involuntary, this was after all nothing but the method adopted by the natives themselves, when desirous of changing the position of their shops. If the air of the 'Fleet Street' of Siam does not agree with Mrs. Yowchowfow and her children, or they wish to obtain more aristocratic footing by being domiciled higher up and nearer to the king's palace, then all they have to do is to wait till the tide serves, and loosing from their mornings, float gently up towards the spot they wish to occupy. On such occasions the men are armed with long bamboo poles, to keep their houses from coming in contact with any of the many vessels that are at anchor in the river; and every soul on board every ship greet every one with a hail, halloo, and scream to each other in a most appalling manner, leading a stranger to imagine that the interests of the state must be at stake, and dependent entirely on the safe navigation of that one small floating house. Bangkok, the modern capital of Siam, and the seat of the Siamese Government, was computed at the period of my residence there, to consist of seventy thousand floating houses or shops, and each shop, taking one with another, to contain five individuals, including men, women and children, making the population amount to 350,000 souls, of which number 70,000 are Chinese, 20,000 Burmese, 20,000 Arabs and Indians, the remainder, or about 240,000 being Siamese. This was the best census we could take, and I believe it to be nearly accurate. The situation is extremely picturesque. I was told that, when the Siamese relinquished the ancient capital of Yuthia, and first established the throne at Bangkok, the houses were built upon the bank of the river itself but the frequent recurrence of the cholera in

duced one of the kings to insist upon the inhabitants living upon the water, on the supposition that their dwellings would be more cleanly, and consequently the inmates less subjected to the baneful effects of that scourge of the East. This is a remarkable fact, that an uneducated, nay, uncivilized barbarian should have entertained such notions as to the conduciveness of cleanliness to health and vigour; but, alas! so slothful are the people, so frightfully indifferent to their own interests and health, that, although with very slight exertion, their cabins or floating houses might be more easily scrubbed and scoured out every morning, they are seldom ever so much as swept. There is another and great disadvantage to which this system has exposed the inhabitants; it is this; cattle, dogs, cats, nay, even sometimes human bodies, that have been drowned on the river higher up on the Yuthia side, are perpetually being swept down by the current, and getting entangled underneath the houses amidst the bamboo or poles that moor them: the inmates as well as the neighbours are assailed with pestilential odours which they have no possible means of ridding themselves of; and they have no alternative but abide patiently till time and tide carry away this nuisance, being subjected in the interval to local miasma quite sufficient to breed typhus in a malignant form, another inconvenience is, that these houses, being so little elevated above the water's edge, are necessarily damp and humid, and consequently rheumatic fevers are extremely prevalent during the monsoons.—*Neal's Residence in Siam.*

MILK, BREAD, AND BUTTER TREES.

"We had heard several weeks before, of a tree, the sap of which is a nourishing milk. It is called 'the cow-tree'; and we were assured that the negroes of the farm, who drink plentifully of this vegetable milk, consider it a wholesome aliment. All the milky juices of plants being acrid, bitter, and more or less poisonous, this account appeared to us very extraordinary; but we found by experience during our stay at Barbula, that the virtues of this tree had not been exaggerated. This fine tree rises like the broad-leaved star-apple. Its oblong and pointed leaves rough and alternate, are marked by lateral ribs, prominent at the lower surface, and parallel. Some of them are ten inches long. We did not see the flower: the fruit is somewhat fleshy, and contains one and sometimes two nuts. When incisions are made in the trunk of this tree, it yields abundance of a glutinous milk, tolerably thick, devoid of all acridity, and of an agreeable and balmy smell. It was offered to us in the shell of a calabash. We drank considerable quantities of it in the evening before we went to bed, and very early in the morning, without feeling the least injurious effect. The viscocity of this milk alone renders it a little disagreeable. The negroes and the free people who work in the plantations drink it, dipping into it their bread of maize or cassava. The overseer of the farm told us that the negroes grow sensibly fatter during the season when the palo de vaca furnishes them with most milk. This juice, exposed to the air, presents at its surface (perhaps in consequence of the absorption of the atmospheric oxygen) membranes of a strongly animalized substance, yellowish, stringy and resembling cheese. These membranes, separated from the rest of the more aqueous liquid, are elastic, almost like cautchouc; but they undergo, in time, the same phenomena of putrefaction as gelatine. The people call the coagulum that separates by the contact of the air, cheese. The coagulum grows sour in the space of five or six days. Amidst the great number of curious phenomena which I have observed in the course of my travels, I confess there are few that have made so powerful an impression on me as the aspect of the cow-tree. Whatever relates to milk or to corn inspires an interest which is not merely that of the physicial knowledge of things, but is connected with another order of ideas and sentiments. We can scarcely conceive how the human race could exist without farinaceous substances, and without that nourishing juice which the breast of the mother contains, and which is appropriated to the long feebleness of the infant. The amylaceous matter of corn, the object of religous veneration among so many nations, ancient and modern, is diffused in the seeds, and deposited in the roots of vegetables; milk, which serves, as an aliment, appears to us exclusively the produce of animal organization. Such are the impressions we have received in our earliest infancy: such is also the source of that astonishment created by the aspect of the tree just described. It is n t here the solemn shades of forests, majestic course of rivers, the mountains wrapped in eternal snow, that excite our emotion. A few drops of vegetable juice recall to our minds all the powerfulness and the fecundity of nature. On the barren flank of a rock grows a tree with coriaceous and dry leaves. Its large woody roots can scarcely penetrate into the stone. For several months of the year not a single shower moistens its foliage. Its branches appear dead and dried; but when the trunk is pierced there flows from it a sweet and nourishing milk. It is at the rising of the sun that this vegetable fountain is most abundant. The negroes and natives are then seen hastening from all quarters, furnished with large bowls to receive the milk, which grows yellow, and thickens at its surface. Some empty their bowls under the tree itself, others carry the juice home to their children."—*Humboldt's Travels in the Equinoctial Regions of America.*

MATCH-MAKING.—A new machine for splitting the timber used in making matches has lately been introduced at Augusta, Ga. It splits with ease 20,000 a minute or 1,000,000 an hour, and turns them out ready to be dipped. Mammas will say it is much better a split should precede a match than follow it.—*The Builder.*

Agricultural Journal,

AND

TRANSACTIONS

OF THE

LOWER CANADA AGRICULTURAL SOCIETY.

MONTREAL: OCTOBER, 1852.

EXHIBITION OF THE UPPER CANADA AGRICULTURAL ASSOCIATION.

This very interesting Exhibition took place at Toronto, on the 21st, 22d, 23d, and 24th of September last. It is not necessary that we should enter into peculiar details, a description of the Show ground, or the temporary buildings and tents erected for the accomodation of exhibitors, as the newspapers have already fully described all these matters, we shall therefore confine our remarks to what we conceive may be interesting and useful to our readers, as agriculturists.

That the Exhibition was highly creditable to the agriculturists of Upper Canada, there cannot exist a doubt. The horses, neat-cattle, sheep, and swine, were excellent, affording convincing proof of the skill and enterprize of the farmers of that section of the Province.—The show of horses, and of Durham cattle in particular, were very superior. The show of Leicester and South Down sheep were also very good. We were told of prices paid for some of these stock that we would scarce venture to publish, least our statement might be discredited. A few French Merinos were shown of large size, and said to produce a quantity of wool which we did not believe possible, from the appearance of the sheep. We observed that one of the rams had not been shorn this year. These sheep were also said to be sold for what was a very large price, in our estimation. A small lot of Highland cattle were shown, imported by a gentleman from the Isle of Sky. They were of small size, but we have no doubt, they might be found a profitable stock for many sections in Canada. Their peculiar form, fine mellow hides, and short legs, proves their propensity to fatten readily; but as for their milking qualities, we are not acquainted with them. There was a great display of fowls. The show of implements was very fair, both of Canadian and American manufacture. We were glad to see that Mr. Jeffrey, of Petite Côte, near Montreal, obtained prizes for a drill and swing plough, a drill grubber, and a root slicer. This proves that we may have good implements in Lower Canada, if we only purchase them. The fall sown wheat, was of very superior quality, in particular, the sample that obtained the first prize. The Indian corn was excellent, but the specimens of roots were not of very large size. The show of fruit was not extraordinary, though we believe it was generally superior to any we could show in Lower Canada. We have seen numerous varieties of very superior plums in the neighbourhood of Toronto. The show of dairy produce was very good, particularly cheese; some belonging to a Mr. Caldwell, of the Wellington District, made in 1851, was of very superior quality. The other departments at the show, we shall not pretend to describe, as we conceive they are not directly connected with agriculture. We noticed a flax dressing machine, which was not expensive, and appeared to be a very efficient implement; but one of the wheels being broken, we did not see it in operation. It would be very desirable to procure one or more of these machines, for experiment in Lower Canada. We shall give a full description of it in our next.

There was a very numerous attendance at the Exhibition. We were told that 30,000, persons visited the show ground, on the third day (Thursday the 23d) and from the crowded state of the extensive enclosure for the whole day, we can credit this statement. The most disagreeable circumstance connected with the Exhibition, was the crowded state of the hotels and lodging places.—For ourselves we were so fortunate as to obtain accomodation from a gentleman, Mr. Crew, acting assistant Secretary of the Association, who very kindly invited us to his house, and kept us there until the end of the fair,

and to this gentleman we beg to offer our most grateful acknowledgments. At any future Exhibition, the Upper Canada Agricultural Association could not confer a greater favour upon visitors from Lower Canada, whether invited or not, to these exhibitions, than by procuring comfortable accomodation for them at hotels, for which visitors would be willing to pay liberally. Agriculturists from Lower Canada do not go so great a distance, exactly, to pay complimentary visits, but rather to see the Agricultural productions of the country, to make accquaintance with those who have produced them, and to learn the means by which these results are obtained. These ought in reality, be the motives of agriculturists in attending such exhibitions, or they should not visit them, and we confess they have always been our motives; we were desirous to see, hear, and learn, and we cared not a straw, about giving or receiving compliments.

Perhaps it may be as well to submit a few general remarks in reference to this exhibition. Though not an inhabitant of Upper Canada, we were delighted to see the skill and intelligence of the agriculturalists with whom we had the good fortune to have any communication. It is these men, and others like them, that has made the late exhibition an interesting one. It would be in vain that Upper Canada had a good soil, and favorable climate, if there was not skill and capital employed in its cultivation. In Upper Canada, they have a highly respectable class of gentlemen residing throughout the country, mixing and associating with practical farmers, who thus assist and improve each other. These are generally emigrants, a large portion of whom, have brought capital, and some both skill and capital to the country. We have not the same advantages in Lower Canada, as very few of those who have the means of proceeding further, settle in that country. There is an unjustifiable prejudice against Lower Canada that prevents the settlers who would be the most useful from settling there. Another cause, that emigrants are anxious to go on to their friends, and settle amongst those who are known to them, and are doing well, and unquestionably there is a great advantage when coming to a strange country, to be able to make a settlement amongst a skilful and thriving class of farmers, rather than where they were not so. It creates a justifiable emulation to cultivate and manage as well as the best they see about them, and if they require instruction, they cannot fail to learn. Good breeds of live stock have been introduced by settlers who had capital, and they have spread far and wide throughout the country, and their management appears to be well understood. Here is a commencement of the materials which are necessary to constitute a good system of agriculture, and to these causes we may fairly ascribe the present favorable position of agriculture in Upper Canada. We do not pretend to say that all the settlers who arrive in that country are experienced farmers having capital, nor would it be advantageous if they were. Those, however, who have capital, employ such as have none, until the latter acquire both practical skill, and sufficient capital to commence on their own account, and then they also become useful farmers. Hence Upper Canada has, at the present moment, skilful farmers in every section of the country who will be sure to maintain the progress of agricultural improvement. A skilful and industrious class of settlers are as necessary to secure the prosperity of a country, as a good soil and climate, and skill and industry will frequently overcome the disadvantages of an unfavorable climate and soil. On our first acquaintance with the agriculturalists of Upper Canada, at the exhibition of Niagara, two years ago, we formed the same opinion of them as we now submit, and the late exhibition has only confirmed that opinion. On a former visit to Toronto market, we were led to suppose, that beef, mutton, lamb and veal, were of as good quality in Montreal market as that of Toronto. We now, however, admit we were in error, and have no hesitation in saying, that the *general* quality of the beef, mutton, lamb and veal is much superior in Toronto, to either

Montreal or Quebec. There may be occasionally as good a show of these articles in our markets as in Toronto, but it is not generally so.

We now beg to say a few words of Lower Canada, and its capabilities for a successful system of husbandry. First, as to the quality of the soil, we do not believe that it is much, if anything, inferior to that of Upper Canada. There are, doubtless, fine tracts of new land in Upper Canada, but so there is of old, cultivated, and new land in Lower Canada.

In the latter country, wheat will not succeed so well as in the former, but every variety of other grain, with the exception, perhaps, of Indian Corn, will succeed equally well as in Upper Canada, and some better. Root crops, hay, and pasture, on an average, will be more productive in this section of the Province; why then should we not be able to have good stock, good dairies, and profitable farming? It is not, certainly, either the climate or soil that would prevent it, and we have better and more convenient markets. We must, therefore, endeavour to find some other cause why our Agriculture should not be generally as far advanced in improvement as in Upper Canada. There is as good farming in Lower Canada as in any part of America that we have seen; but this we are sorry to be obliged to admit, is not the general character of it. We have fairly described what we know of the state of Agriculture in Upper Canada, or rather the results of their system and management, and also, submitted our opinion as to the means by which this system has been introduced, by, we may say, an entirely new population. This latter circumstance of a new population introducing their own system of husbandry may have been favourable to the establishment of a more perfect system, than would be possible, where a defective system had been previously in operation for a long period. All these matters deserve serious attention. We know by experience, it is much less difficult to establish a good system of husbandry, (if we know it,) in a new country, than in an old country, where defective modes of farming have been long practised. In the first case there are not any old customs or prejudices to be overcome, but in the latter case, we have all these difficulties to contend with, when attempting to introduce a new system of Agriculture. We would strongly recommend parties interested in Agriculture in Lower Canada, to visit Upper Canada, and their Agricultural Exhibitions, and they will be much interested, and acquire much useful information. There is nothing like seeing and judging for one's self. It will be easy to perceive the lively interest that is manifested by a large proportion of the population, in the progress of Agricultural improvement. It would be difficult to persuade the citizens of Montreal to subscribe six or eight hundred pounds currency towards an Agricultural Exhibition, as they have done in Toronto.

We hope it may not be supposed from what we have stated, that Agricultural improvement is not progressing in Lower Canada. On the contrary, we can assure our readers that the progress of improvement is very satisfactory, and there is not a doubt but it will advance rapidly when the advantages of an improved system is more generally known in the country, by the rural population. The cultivation of root crops have surprisingly extended within the last two or three years, where they were never before cultivated, and the Canadian farmers are becoming fully sensible of the value of these crops. Improved husbandry does not so generally prevail in this section of the Province as in Upper Canada, but we confidently hope we shall not be long subject to this reproach, and however greatly we admire the latter country, and her agriculturists for their skill and industry, we would not exchange the numerous advantages of Lower Canada for that of Upper Canada.

On the evening of Wednesday and Thursday, several addresses were delivered in the St. Lawrence Hall to a crowded audience. On Wednesday Professor Buckland delivered an excellent lecture, and gave a full exposition

of the manner in which he proposed to conduct the Experimental Farm which had been placed at his disposal on the College Grounds, and we have no doubt the farm will succeed under his able management. On Thursday evening the Minister of Agriculture, the Hon. Malcolm Cameron, addressed the meeting, and gave a full explanation of the duties which would devolve upon the proposed Beaureau of Agriculture, and also explained the provisions of the new Agricultural Bill now before Parliament, for Lower Canada. It should be very satisfactory to Agriculturists, that they will now be directly represented in the Government, and we have confident expectations that it will have a most beneficial influence upon our Agriculture. We were glad to hear from the Superintendant of Education in Upper Canada, that he was in favour of introducing Agricultural Books into the Common Schools for the study of pupils. This is a measure we have advocated in our own and other Journals for many years, and we had come to the conclusion that Dr. Ryerson was opposed to it, as we did not perceive that the plan was advocated in the Journal of Education, published by that gentleman. It appears, however, that he is now disposed to introduce this mode of primary instruction, and we have no doubt of the advantageous results. All we regret on the subject is, that our proposition did not meet with more favour long ago, as it was quite as necessary ten years ago as it is now.

On the afternoon of Friday, the President of the Associaiion, delivered his address at the show ground, but we were not present at the time.

The President of the Lower Canada Agricultural Society, P. E. Leclere, Esq., and A. Kerezkowski, Esq, David Laurent, Esq., and Dr. Leprohon, Directors of that Society, were at the exhibition. We met several other gentlemen there from Montreal and other parts of Lower Canada, but the attendance from that part of the Province was not numerous. We do not pretend to give anything like a full report of all that was interesting at the exhibition. Our attention was principally directed to the live stock, and agricultural products, and the object of this report is to give information to Lower Canadian Agriculturalists that may be interesting and useful to them, and to submit our humble ideas as to the comparative capabilities of Upper and Lower Canada for agriculture. In our endeavours to do this, we may inadvertently give offence in some quarters, but we can assure our readers that we would not willingly offend any party in Upper or Lower Canada. It is our firm conviction that if agriculture in Lower Canada should not generally be so far advanced in improvement as in Upper Canada, the fault is not in the soil, climate or situation. The ravages of the wheat fly was a great drawback to the agriculturalists of Lower Canada, from which the farmers in Upper Canada was comparatively free; but now they are introducing a greater variety of crops, and will not be so much depending upon wheat as heretofore, and as they are at present in Upper Canada. The breeds of neat-cattle are not so large in Lower as in Upper Canada, but it remains to be proved to our satisfaction, whether a moderate sized cattle of good form is not better adapted for this country than a very large size, and will be more profitable for the farmers. The winters are undoubtedly more severe with us than in the Upper Section of the Province, and must necessarily require a well sheltered yard, and warm stabling for animals, so as to equalize our temperature to that of Upper Canada. If we can do this, and produce as much food from a given quantity of land as they can in the latter country, we cannot see that the severity of the winter injures our circumstances much. It is very desirable that we should be fully sensible of the advantages of our situation. If we attempt to find a justification for bad farming, in any imaginary inferiority of soil, climate or situation, we may at once give up all hope of improvement. Fortunately, we have abundant proof that our opinion of Lower Canada is correct, in the many excellent farms to be met with in every section of the country, where justice has

been done to them, and it will not be supposed that these farms are favored by situation or climate, more than those which surround them.

There are some other things in which we are far behind our Toronto friends. For instance, in beautiful shaded walks, such as the College Avenue, and College Grounds at Toronto. There is not so much as a perch of such roads, walks, or grounds for the accommodation of the citizens of Montreal. Our citizens may walk the dusty or muddy streets, or remain in their houses, which they please. In one point, the wharfs at Montreal are superior to any we have seen, but they are not exactly a suitable place for walking except for once, to see them. We cannot but say, that the want of suitable walks for exercise and recreation in a city of 60,000 inhabitants is a certain indication of the want of refinement in those who have power to provide such accommodation. In the British Isles, where shade is not so necessary as here, we could seldom see a town of one fourth the size of Montreal, without beautiful shaded walks, for the public use. Men of wealth may have such advantages in their own gardens, but this should remind them, that those who are constantly and labouriously employed, require, fresh air, and recreation, much more than they do.

In conclusion, we beg our report may be read with indulgence. We were not particular about arrangement, but set down our thoughts as they come to us, and we were so anxious the Journal would be published the 1st of the month, that we had not opportunity to copy it a second time.

We should not do justice, were we to omit stating the great attention we received from the conductors of the American Line of steamers. We left and returned in the British Queen, and the accommodation and attention we received in that steamer exceeded anything we ever experienced in steamboat travelling. To Captain Laflamme, who commanded this boat we beg to return our best thanks. The steamers from Ogdensburgh to Lewiston were splendid boats, of large size and great power, and in these also the accommodation was excellent, and the attention to the passengers all that could be desired.

We have recived a report from our respected friend, T. C. L. Dubois, Esq., of Chicoutimi, Saguenay, the report is in French, and we shall give a translation in the next number. If all Presidents of County Agricultural Societies would send us similar reports on the state and progress of agriculture in each locality, we should be able to make this Journal much more interesting and useful to our readers, and indeed we cannot see what objection there could be to making these reports by all Agricultural Societies organised for promoting the general improvement of our agriculture. They would afford to all such societies an opportunity of suggesting and recommending modes of improvement, as well as describing the state of agriculture in the various localities, and the progress of improvements. In these reports, the experiments made by the best farmers, and their modes of cultivation and general management, might be made known for the general benefit of agriculturists. However the Agricultural Journal may be neglected and disregarded by some agriculturalists, it certainly might be made particularly useful to our farmers, if the most skilful and experienced agriculturalists would communicate their practice and the results obtained from it. Those who might have an objection to come forward openly, as Mr. Dubois has done, could, as members of County Agricultural Societies, make monthly or quarterly general reports, as coming from these societies. This is a simple, and surely not unreasonable, proposition to our Agricultural Societies, who sincerely desire the general improvement and prosperous condition of agriculture. The Agricultural Journal has a general circulation, though not such a numerous circulation as we would wish. We believe, however, there is scarcely a parish

in Lower Canada, that does not receive one or more copies, and therefore any useful information they would contain, would be generally known throughout the country. And further, we might expect that when its interest and usefulness would be increased, the circulation would also be extended in the same proportion. We have been constantly soliciting communications from experienced farmers, but to no purpose. Farmers object to book farming, and pretend they cannot receive any instruction from agricultural publications. These objections appear to us very absurd; good modes of agriculture cannot be made bad ones, by describing them in a book or periodical, and men of any pretensions to agricultural skill, cannot be led into error by statements in books or journals that are at variance with the principles of a good system of husbandry; however, such statements may impose upon the unskilful and unexperienced. But it is to prevent erroneous statements and recommendations, that we would invite skilful practical farmers to communicate their useful suggestions and practical experience for the instruction of their brother farmers, and thus make this Journal really useful, if it is not so at present.

Mr. Dubois' statement in reference to hay, is one of the best proofs he could adduce of the progress of improvement at the Saguenay. Good pasture, good meadows and good stock of fine cattle, is the very best and most profitable system of farming they could adopt at the Saguénay. We believe the soil and climate are favorable also for green crops, so necessary for the profitable keeping of live stock. We wish it was in our own power to obtain any indulgence in regard to postage on such communications as Mr. Dubois has favored us with. The Post Master General has already very kindly consented to remit the postage on the French copy of the Agricultural Journal, until a correct list of subscribers is made out, but we would not presume to apply directly for any further concession. Mr. Dubois may rest assured that we shall always be most happy to receive his communications, and be much obliged to him for them.

In the present circumstances of Canada, perhaps the raising of stock and attention to the dairy would be found as profitable as any other mode of farming that could be adopted. There can be no question on this subject in a large proportion of Canada, remotely situated from our cities, that live stock and the dairy would be the most suitable and profitable. Tillage cannot be altogether excluded from this mode of farming, because green crops are required for stock, and after green crops there must be grain crops to lay down the land again. A certain extent of tillage is always necessary whatever the system of husbandry adopted, to keep the pastures and meadows in good condition; but the land in tillage need not be more than from a third to a fifth of the whole, or perhaps a less proportion in some situations. Horses would pay well, but in raising horses, great care is necessary to be observed with them while young, to have them kept separate from the other horses, and to have suitable boxes or stalls, and yards for them, so that they may not get injured by vicious horses. We have seen valuable young horses injured by a kick, and rendered useless by the injury. When at pasture they are not so liable to these accidents, but in the stables they require constant attention and care to prevent the possibility of injury. The breeding of a good description of neat cattle would also pay very well at present prices, and these prices are not likely to fall. Dairy produce brings fair prices, and the demand is almost sure to continue. A more careful and skillful management of the dairy is necessary in numerous instances to make it as profitable as it is capable of. The dairies are generally defective in their construction, and it is difficult to manufacture good butter and cheese in a dairy that is not suitable, and of the proper temperature. The value of the produce obtained from a dairy of 12 cows, properly managed,

would be nearly double that obtained from the same number not well managed, though the quantity and quality of the milk might be the same from each lot of cows. This is a great drawback on dairies not skillfully managed. A competent dairy-woman is one of the most difficult servants to procure in Canada, for those who have to hire them, and the milk is little better than wasted, where there is not a dairy-woman who understands the business. Sheep would pay well in Canada, if of good breed, and carefully kept. Both mutton and wool may be sold for a fair price. They must, however, be kept in a proper manner, particularly at lambing time, so that the lambs shall not die by neglect, as they so frequently do in this country. If the lambs are lost by neglect, it takes away the profit of keeping sheep, shelter and good food are essentially necessary for the ewes during winter, at lambing time, and the lambing time should not be until after the middle of March, unless where there is the best accommodation for them. Rams should never be allowed with the ewes except at the proper season, and that will not be until after the middle of October or 1st of November. The males not intended for breeding purposes ought to be castrated at a month or six weeks old, and male calves at a week old, neglecting to do this at the proper time is a great injury to stock, and has a great tendency to make the male animals coarse, and deteriorate them in many ways. They will never fatten so kindly or perfectly as when castrated at the proper age. We have got some excellent sheep and neat cattle already in Canada, and every year more are importing. We had an opportunity of seeing lately some fine Leister sheep imported by Mr. Aylmer of Melborne, indeed the best we have seen for a long time; and very much to the credit of those who had them in charge on board the Toronto, we never seen animals in such fine condition after crossing the Atlantic. They could not have been better or cleaner if just taken from the folds of the best stock-master in England. This is a great advantage when parties go to the expense of importing stock. We believe many valuable animals are lost on board ships for want of care and suitable food, and a sufficient quantity of it. Water is another necessary that we suppose is only very sparingly served to them, and this is most injurious, when so long kept on dry food, and no exercise. A good supply of roots or bran should always be taken, the latter to be given well wetted with hot water. It is of great importance to this country to import pure breeds of animals, it is so difficult to get them of pure breed here, and those who do incur the expense, would do well to provide for the safe keeping and attention to the animals on the voyage out, and should also be insured. It is a matter of some difficulty to determine which are the best breeds, but situation and many other circumstances must have a great influence in determining the breeds most suitable. Short horned may answer well in one place. Devons and Ayrshire in another, and pure Canadians in another, and the latter breed are capable of improvement by suitable crossing, so as to be a profitable breed in any situation.

We have heard many complain that the imposition of a duty of 12½ per cent on agricultural seeds imported into Canada has a very injurious effect on our agriculture, and has a tendency to check improvement, and we perfectly agree in opinion with those who make these complaints. The neighboring States, we believe, admits these seeds free of duty, and we conceive, this country should adopt the same plan. These seeds may be imported by the St. Lawrence at a lowr ate of duty now, but the seed grown in Europe this year (which is most valuable to import) cannot be imported by the St. Lawrence in time for next spring sowing, and consequently must come by way of the United States, to be of any use to the farmers next year. It would be very desirable that agriculturalists should be able to procure the best seeds at as low price as possible. They are not to sell again, but to sow, and there are so many risks before a profit can be

realized on the produce of these seeds that we conceive they should not be subjected to a heavy duty. We maintain that the produce of the country pays nearly all the revenue, and it is a great injustice to make the *seed* of this produce, also, pay revenue. It is like collecting tithes from the seed, instead of the produce, and therefore must have a tendency to diminish production, as well as discourage sowing seeds, that above all others are necessary in an improved system of agriculture.

HEMP AND FLAX.

Enquiries have been made of us respecting hemp and flax, and we shall endeavour to answer them in a future number. We have for a long period recommended the cultivation of these plants in Canada, and from what we know of the country, and our experience of the production of flax and hemp, we have no doubt whatever that they might be produced here in the greatest perfection. Flax may be grown that will produce about two tons of straw to the acre beside the seed, and of the latter there may be from eight to twelve bushels to the acre, or perhaps more. Of course the soil must be suitables and properly cultivated to give these returns. We have seen hemp grow to the height of nearly ten feet, and there is not a doubt that very heavy crops may be raised. The great objection to raising these crops in Canada has been the want of machines to dress the fibre. Indeed we are not likely to see them much cultivated until the farmer can sell the straw and seed immediately after it is raised. If such a market was certain to the farmer, a large quantity of hemp and flax would be raised annually, but without this market, agriculturists will not incur the risk of cultivating plants which they may not be able to dispose of.

We beg to call attention to the three District Cattle Shows which are to take place this month. The District of Montreal, at Terrebonne, on the 6th, the District of Quebec, at Point Levy, on the 12th and 13th, and the District of St. Francis and Three Rivers, at Melborne on the 13th and 14th of October. We hope these shows will be well attended. There is the advantage of rail-road to the latter place, and this circumstance will induce many to go to that show.

AGRICULTURAL REPORT FOR SEPTEMBER,

Up to the 11th, the weather was very hot and dry, with an unclouded atmosphere, and must have produced ripeness in any crops that were near maturity. It may be possible that the excessive heat has in some cases prematurely ripened crops, but we are decidedly of opinion, that dry weather in September, is more favorable for crops generally, than wet weather would be, though pastures and after grass may suffer by it. We however had a considerable fall of rain on the 11th, 12th, 20th, 25th, and 27th, that will greatly serve pastures and grass, and soften lands for the operation of ploughing, which was impossible to execute previous to that rain. We do not recollect to have seen the soil more dried up and hard, than it was the first ten days of September. The wheat, which was not sown before the 25th of May this year, is considered to be generally a fair crop, and not much injured by the fly, though it has suffered some damage. There is no doubt but the fly continued to a later period with us this year than it has ever done before. We have seen the larvae of the fly in wheat, that was not in ear until the 1st of August, and this is an unusual occurrence. We have remarked that the smooth-eared varieties of wheat are liable to be more injured, than the bearded varieties. In the Spring of 1851, we had some seed wheat imported from Scotland, though by mistake it got into other hands, who sowed it on arrival in the month of May of that year, and again sowed the product last Spring, and has sent a sample of it in the ear and straw to the Rooms of the Lower Canada Agricultural Society. It is known in Lawson's Catalogue as the Fern Spring wheat, and the ear is bearded. The sample

at the Rooms is excellent, the ear long and well filled, and the straw fine and free from rust. It does not appear to have suffered by the fly. Perhaps it would be as suitable a variety for this country as we could have. We were induced to send for it, from the favorable description of it in Lawson's Catalogue, and it would be desirable to give it a fair trial, as a new variety. It is of some consequence to the country now, that we should have varieties of wheat that would succeed, though sown late, as we believe there is no other chance of safety from the wheat fly, except by sowing late, but any variety we do cultivate, should not be liable to rust. The Black Sea Wheat, when first sown here had a hard wiry straw, that did not rust, but from frequent cultivation in Canada, it appears to have become acclimated, and the straw is now quite different from what it was when first grown in Canada, and has become liable to rust. By a fresh importation this would be remedied, and it is very necessary. We understand, that what is known as the Laurent, or Fife Wheat, has been free from rust this year, though sown late, and this is very much in its favour, but it is said to have been greatly injured by the fly. We shall every year be gaining information by experience, of the best varieties of Wheat to sow, and those that are found to succeed best, should be chosen for cultivation. It is quite possible to improve varieties of any grain, by selecting choice ears, and cultivating the seed from them carefully, and giving it ample space to grow, and come to the greatest perfection.—Farmers are not particular enough about these matters, but it is by this means that choice varieties have been obtained in England, that have proved very advantageous to that country. We have some good varieties of both oats and barley, but these also require to be frequently changed and renewed. They get mixed, and otherwise deteriorated, and lose all their best qualities in a few years. We fear that this deterioration is in a great measure, owing to careless and defective cultivation in this country. Barley, oats, and peas, when there are good crops of them, are nearly as profitable as wheat, and frequently much more profitable, but we must not give up the cultivation of wheat nevertheless, as it is the most necessary and useful of any crop that is grown. Though this year has been extremely dry, grain crops have been partially effected by rust. This was produced by slight rain, which occurred in August.—Farmers are often condemned as a complaining disatisfied class, but very unjustly. If they only describe the state of the crops or the weather, unless this description is favorable, they are immediately set down as men that can never be satisfied. A few days rain, or an untimely frost, may have a very injurious influence on the produce of a farmer's labour for a year, and if he mentions this to any one but a farmer, he is ridiculed, his representation doubted, and told to his face, that he is like the rest of his class, always complaining. So far as we know anything of farmers, we believe there is not any class of men, that have a firmer reliance upon the goodness of the Creator, and are more grateful for his benefits, because from the time they commit the seed to the ground, they see day after day, the progress of the plant, watered by the rain and dew, and stimulated by the light and heat of the sun, until the seed is matured, and the harvest comes, that fills his store-houses with food for himself, his household, and his cattle. The crops have been harvested this year, with much less trouble and expense than usual, the weather has been so extremely favourable. This is a great advantage, as the produce can be housed in good condition, without any waste, and will compensate for some deficiency of crop, if there was any; but we conceive there will be a full average, except of hay, which is very much below an average. Barley, oats, peas, and potatoes have been excellent, where any justice was done to them, and wheat, we believe, is better than last year, if what remains yet unharvested, is safely housed,

of which there appears every reasonable probability. The potatoe crop up to this period, has not been better for some years, and they are now generally ripe. Other root crops may not be so abundant, in consequence of the seed not coming up regularly in spring, but we have seen excellent crops of mangold wurtzel and carrots. These roots will be found very useful this year, when hay is so short. We are rejoiced to see that their cultivation is every year extending; and farmers are becoming aware of the advantage of growing them. This is one of the most manifest improvements in agriculture, connected with sowing clover and timothy seed, which is coming into general practice. A few years back, there was scarcely any English, French, or Dutch clover seeds imported to Canada, and now there are many tons of it imported annually; and when of good quality, and fresh, it is certainly much better, than any raised in this country. American clover seed, from whatever cause, has a large proportion of the grains not sufficiently matured, are imperfect and do not grow.

The market prices should be very satisfactory to farmers. Hay is high, and is likely to be higher. Butter is also much higher than usual, but the high price of these articles is to be attributed to the dry season principally, and the scarcity of these products in the United States from the same cause.

September 1, 1852.

In the last number of the Journal we stated that a gentleman proposed visiting Europe this fall to procure fresh seed wheat, from the Black Sea; we are now authorized to state that the gentleman in question is P. E. Leclere, Esq., President of the Lower Canada Agricultural Society. It is the attention of two respectable Mercantile Firms of this City to import, direct from Odessa, in Russia, a cargo or two of the three months wheat, which has been cultivated in this country with so much success when originally imported from that quarter. These firms have proposed to Mr. Leclere to proceed for them to Odessa, in order to select the wheat on the spot and to purchase it, if possible, from the growers; to which proposition Mr. Leclere has willingly acceeded to. It would therefore be desirable that the County Agricultural Societies who might be disposed to secure any quantity of this wheat, should meet, and determine whether they would require any and what quantity. Already a gentleman called at our office, and stated that in one Parish, on the Island of Montreal, one thousands bushels would be taken for seed, if imported in time for sowing in the ensuing spring. We have also had letters from parties in the neighbouring states, saying that considerable quantities would be required. If these firms should find sufficient encouragement, we may rest assured that Mr. Leclere will not purchase any wheat but the right sort and will obtain properly authenticated certificates of the distinct variety of wheat and of all other necessary information respecting it, so as to be able to give every satisfaction to parties here on his return. Such a favorable opportunity may not occur again for years. Farmers in Lower Canada have sufficient experience now how necessary it is to obtain new seed of this wheat, from the country where it was first known to be produced, as all our samples are very much deteriorated and require renewal. Mr. Leclere might also be able to effect an arrangement with some parties in the country, bordering on the Black Sea, who would at any future time, forward to this country any quantity of seed that might be required. Should the above project be carried into effect, we consider it would be a great advantage to the country, as the wheat will be here next spring in sufficient time to be sown.

The wheat may of course cost something more than our Canadian wheat will sell for, say nine or ten shillings, but that is of little consequence, if the produce will be as great as it was from the Black Sea wheat when first grown in Canada. The different Agricultural Societies will bear in mind that, by

saw, they have no Provincial duty to pay on wheat imported in this Country from any part of the globe.

We would beg as a favor of the newspaper press to give insertion to this article, or to notice it in some way that farmers throughout Canada, may be aware that there is an opportunity of obtaining this wheat, and on the most favorable terms; for it is the attention of the two Mercantile Firms above alluded to, to dispose of the wheat so imported at a very small advance on the prime cost.

It appears that the American Reaping Machine is not generally approved of in the British Isles. In England, its use in cutting grain is said to be more expensive than by the ordinary method, and that if the grain is ripe, it is sure to shed a considerable quantity. At the last exhibition of the Royal Irish Agricultural Improvement Society, held at Galway, there was a trial of this machine, and the following report of it appears in the *Irish Farmer's Gazette:*—

Crosskill's improved Hussey's reaper was tried on both days, which as usal when the crop stood erect, cut both clean and well, but when lodged operated very indifferently. We are by no means pleased with the mode of collecting and casting off the cut corn. In America, where corn is cheap, and labour dear, the loss sustained by the use of the reaping-machine is positively a gain when contrasted with the saving of labour; but in this country, where corn is comparatively dear, and labour cheap, the waste turns out a dead loss, without any compensation. In fact, we are decidedly of opinion, that the endless web attached to the original reaper by Bell, must be attached to all reaping-machines, to be useful in this country. It saves a man's time in raking off the corn, besides his weight on the machine, and it is said to drop the cut corn on the land in the neatest and best manner. We are promised a trial of Bell's reaper in this country, till which time we must postpone any further remarks on reaping-machines. We understand that Crosskill's is to reap in the neighbourhood of Dublin on Monday next.

To the Editor of the Agricultural Journal.

Sir—As the time is now approaching when the ploughmen will meet to exhibit their skill in their useful calling, I take the liberty humbly to offer a few remarks to our farming community, through the columns of your valuable Journal.

Discipline has hitherto been wanting to regulate the ploughing matches—the rules and regulations to be observed should be as rigid as on board a man of war in the time of action—no scale or rule is given by which to cut the furrow slice; every man plonghs as he thinks proper, some deep, others light, just skimming the surface.—Then, when the judges appear on the ground, they will naturally ask—Are there any rules given to plough by? the answer is, No. Many ploughmen and others differ in opinion as to what ought to be the proper width and depth of the furrows, so that it frequently happens, that the best ploughing is passed by either without any prize, or with an inferior one.—Another defect is, that the time is seldom stated in which the ploughing should be done; some ploughmen at these matches will take nearly double the time to do their task which they would take if they were ploughing their own field.—Some County Agricultural Societies will not allow the Judges to appear on the ground until the work is done, which, in my humble opinion, is a great mistake, for were they in attendance the whole of the time, they would be better able to form a correct judement, by observing how each man and his cattle wrought, with many other minor points, which are of great advantage in ploughing. The following extract, which I quote from that highly able and useful work, "Stephen's Book of the Farm: which ought to be in the hands of every farmer, may prove of use to some of our Agricultural Societies—He says, "The Judges who have been brought from a distance and have no personal interest in the exibition, are requested to inspect the ground after all the ploughs have been removed, having been kept away from the scene during the time the ploughs were engaged. This appears to me an objectionable part of the arrangements, which is made on the plea that, were the judges to see the ploughs at work, some particular ones might be recognised by them as belonging to friends, and their minds might thereby be biased in their favour. Such a plea pays a poor compliment to the integrity of a judge, and, any farmer who accepts that responsible and honoured office, and would allow himself to be influenced by so pitiful a consideration, would deserve not only to be rejected on any such occasion, but scouted

out of society." I am of opinion also, that each ploughman should use his own horses and his own plough, which is not the case at present in the county of Quebec; many are in the habit of borrowing both ploughs and horses. Were every man constrained to this, by the requirements of the societies, every man would strive to procure, keep and entertain, good horses and good ploughs. I shall make no excuse, or apology for a wet or stormy day, but leave the above remarks to your superior judgment.

And remain your very obedient servant,

A CANADIAN PLOUGHMAN.

St. Foy Road, County of Quebec,
10th of September, 1852.

To the Editor of the Agricultural Journal.

Dear Sir,—As the cultivation of oats has become very extensive in the county and district of Quebec, and a great many farmers and others, entertaining different opinions as to which, among the varieties of that grain, would be most suitable to the soil and climate of Canada East, generally, and at the same time yield the greatest quantity of meal, I, with many others would be highly gratified by hearing the opinion of the "Agricultural Journal" on the subject—

Yours truly,

A CANADIAN FARMER.

St. Foy, County of Quebec,
11th September, 1852.

Cleaning seed is almost always paid for by measure. It used to be paid for in some districts, in the case of wheat, by a portion (one twenty-fifth) of the grain thrashed, and this, when the crop was an average one, was a pretty fair wage. Thrashing wheat and cleaning it costs generally 5d. to 6d. a bushel; thrashing oats, 1½d. to 2½d. and barley, 2d. to 3½d.; beans, 2½d. to 3d. and peas, 2½d. to 3½d.—the price, of course, varying with the yield of grain and the bulk of straw. There can be no doubt of the policy of using machinery for this purpose; and none, of the superiority of steam or water for this purpose over horse power. A day's work of six horses, and of one man to look after them, may cost £1. A six horse power steam engine and boiler need not cost £100 more than the horse-wheel needed in the other case; the interest on which, added to the tear and wear of the machine, is not more than 3s. a day during the sixty days on which the machine may be supposed to be at work. Add to this 2s. 6d. for the man who superintends it when at work, and 5s. for the seven cwt. of coals it needs during the day, and you obtain a total of 10s. 6d. in this case, to compare with the £1 in the other. This is much cheaper than horse labor. It was a good reply, made by an intelligent bailiff, to a gentleman who came to see the steam thrashing machine at work. The man was feeding his engine furnace. "Ah!" said the gentleman, who, doubtless, disliked the machinery, as tending, as he supposed, the displacement of manual labor, "I find your horse requires food, just as those of more ordinary kind." "Yes, Sir," returned the other; "but this is a horse that never feeds unless he works." We find an engine costing, as we have said, 10s. 6d. a day, can easily, during that period, thrash, clean, and, if the necessary apparatus be supplied, sack up the produce of 140 cubic yards of straw (settled down) in the rick. This in the case of wheat and barley, may be 80 to 100 bushels; and in the case of oats or beans, from 120 to 200 bushels. To find the cost of this process per bushel we may add to the cost of the engine 2s. 6d. per day as the tear and wear of the thrashing machine, 6s. as the wages of three men, and 3s. 4d. the wages of four women, and we shall have 22s. 4d. as the expense of taking from the rick, thrashing, and building the straw, and cleaning and sacking the grain of 140 cubic yards—a rick of grain. This, taking the yield of that bulk as above, will amount to from 1¼d. to 3¼d. for wheat; from 1½d. to 3¼d. for barley; and from 1⅝d. to 2½d. for oats or beans.

We now come to the last item of our account, BLACKSMITH'S WORK may be bargained for per pair of horses per annum, thus (we copy the agreement with our own smith):—I engage to shoe a pair of horses, and perform all necessary repairs upon a plough, a pair of harrows, a horse hoe, or the iron work of a set of harrows, a pair of hames and plough chains; also to keep in repair a fork and graip for the use of the stable (all new metal and wood work being paid for extra,) for £3 per annum, and the hauling of a load of coals." This will be found cheaper than the keeping a running account with the smith for the various mendings, and, as they occur, as the customary charge for each. The saddler's bill may be contracted for at £1 per pair of horses per annum, for both plough and cart harness—the harness being in good condition to begin with.

With regard to the cost according to the live stock of the farm, we have not much to add. We find that, in 1844, a man and three boys cleaned and cut turnips for, and littered, forty-five head of cattle in stalls, which ate three tons of turnips daily, besides steaming potatoes for and feeding about twelve sows and litter. In the winter of 1850-51 one man and two boys cut turnips, fed and littered, for about sixty head of cattle, fed in boxes, where no daily removal of the soiled litter was required. At the same time, the cleaning of the Sweedes and mangold wurzel was let to a lad for 2½d. per ton, or £10 for about 1000 tons; and he earned, during the winter, at least, 30s. over his day's wages. Again, one lad, about seventeen years of age, earning 7s. a week, with two boys under him earning 3s. and 3s. 9d. respectively, cleaned and cut Sweedes and turnips for 310 sheep, in sheds, and littered them every two or three days. These sheep also ate about three tons of roots daily. We may also mention it as an understood thing in those districts where sheep is folded on turnips in the field, that a shepherd and his boy is wanted for 300 sheep, and another boy is wanted for every additional hundred. Sheep shearing is generally done by the piece at 3s. 6d. to 5s. per acre, according to the size, &c., of the herd and condition of the flock.

In addition to the above statement of charges, we may insert the particulars given by Mr Raynbird, in

his essay on this subject, in the seventh volume of the English Agricultural Society's Journal, where they refer to processes of which we have no experience:—

"Thatching.—The price for thatching ricks is 1d. a yard, or from 10d. to 1s. the square."

"Fencing.—All kinds of hedging, and the laborer required in keeping live and dead fences in repair, and the pulling down of old fences, readily admit of payment for bank work by lineal measurement. In the management of old fences, one of the practices of this part of the country is to cut down the old thorns even with the surface, and then to make good the lower soil which has wasted away from the roots. The price per rod varies with the age and thickness of the hedge, and with the quantity of seed required to make good the bank. From 6d. to 8d per rod is usually paid. This includes topping the bank with the old thorns, as a dead fence. Three, or three and a half rods will be an average day's work; 20d. to 22d. a day may be reckoned a fair days wages for hedging work. Breasting over hedges will cost him 3d. to 4d. per rod, but the price depends entirely on the size of the hedge. Trimming hedges, or the cutting of the young shoots with a light hook may be done for ½d. or¾d. a rod. If shears are used, the cost will be rather more. When fagots are made they are paid for by the score; 6d. a score is paid for the most general size, but the price, of course, varies little with the size and length."

"Filling, Running, Carting, and Spreading Clay, marl, or chalk, are frequently let out by the job to men who, at a certain price per yard, agree to find horses, carts, and men, and food for the horses, with the exception that the employer allows grass and straw chaff. The quantity spread is ascertained by measuring the hole it is taken from; and the price per yard for earthing one furlong is, for clay 7d—1d. being added for every additional furlong."

"Burning Peat Ashes, an uncertain employment in our fickle climate, is generally paid at the rate of £5 per 1000 bushels, or 40 cubic yards."

We conclude with but one additional observation. Of course, measure work is paid for in money, and it is gradually better for all parties that it should be paid for in money alone. Giving beer or cider in addition to money, generally diminishes the sum paid more than is justified by the value of the drink; and these liquors are not of that strengthening character, which some are inclined to believe. While, however, we approve of paying for piece work in money alone, that opinion by no means extends to the payment of our constant day laborers. Amongst a steady, and, if we may use the word, an educated class of farm laborers, possibly money wages may be the best under all circumstances; yet, taking laborers as we find them, they are better off, both in a physical and moral point of view, where that system of payment, partly in grain, and partly in money, prevails, which obtains, as we have said, in Northumberland and some of the Scottish countries.

ON FEEDING AND HOUSING FATTENING CATTLE.

A Lecture was delivered by Dr. Anderson, in connection with the Highland and Agricultural Society of Scotland, in the Justiciary Hall, the Duke of Roxburghe in the Chair.

We have extracted the talented Professor's remarks "on the best modes of feeding and housing fattening cattle, and the breeds most suitable for different districts."

The lecturer observed—I have selected for the subject of the following address a summary of the discussions at the monthly meetings of the Highland Society, during the past winter.

On the first head, that of housing, all refer to the gradual change which has taken place in the mode of accommodating fattening cattle, and the abandonment of large open courts containing from 10 to 20 cattle, and the introduction first of hammels or small courts with sheds for the accomodation of 2 or at most 3 cattle, then of stalls, and still more recently of boxes. The concurrent testimony of all is strongly condemnatory of the first of these practices, and reference is very distinctly made to the scientific facts on which its inferiority depends. It has been conclusively established by scientfic enquiry, that the natural temperature of the animal body is sustained by the consumption of a certain quantity of its food, which during the process of respiration undergoes a change chemically identical with that which takes place in the act of combustion. Now in the animal body, the temperature is always the same, whatever be that of the surrounding air. Thus, if you examine an ox by means of the thermometer during the dead of winter and the height of summer, you will find the temperature to be always the same, and on Fahrenheit's thermometer it will be somewhere about 100 degrees, while the temperature of the air may in the one case be under the freezing point, and in the other as high as 70 or 80 degrees. Now it is very obvious that in the former case, a much larger quantity of food must be consumed, to sustain the temperature of the animal at 100 degrees, than is necessary in the latter, just as a room requires more fire to keep it hot in winter than during the warmer seasons of the year; and it naturally follows, that if we keep the animal in a warm locality, we economise the fuel, and require to supply a less quantity of food, to keep up the temperature of its body at the natural standard.

Now this is exactly what is effected by the improved methods of housing cattle. In the large open court formerly universally employed, they were exposed to every vicissitude of the weather, while in the smaller courts with sheds, or still more, in houses they are protected from the extremes of temperature and an economy of food effected. But a certain quantity of food is capable, under favourable circumstances of producing a certain quantity of fat. If, however, the temperature of the air falls, and an additional quantity of fuel is required to sustain the animal heat, science has shown that the elements so consumed or burnt off, are exactly those which under other circumstances, would go to the formation of fat. It is obvious, therefore, that if we keep the animal warm, we do what would otherwise be done by a portion of the food with which

we supply it, and we might be inclined to say, that the warmer it is kept the better, but practically there is a limit to this. There isa certain. range of temperature which is natural to the animal, and though in the process of fattening, we place an animal to a certain extent in an unnatural condition, we cannot carry this too far without producing various derangements of the system, which would speedily end in positive disease. Our object must be, to sustain only a certain proportion of the internal temperature by external warmth, for the production of a considerable part of it, by the combustion of the food within the body is connected with, and essential to the healthy performance of the animal functions.

But there is also another source of waste of food, which these improved means of housing are also calculated to prevent. It has been ascertained that not only is the temperature sustained at the expense of the food, but that every movement of the muscles produces also a certain consumption of it. If we sit still for an hour a certain amount of the food we have swallowed is consumed or burned off in our bodies, and it can actually be measured, by particular and very complicated chemical experiments, but if we run violently, or engage in any active or muscular exertion, the quantity which undergoes combustion is greatly increased. Now, obviously, if we confine a number of cattle in a large court yard which admits of abundant exercise, we produce the conditions of an increased and uneconomical consumption of food; while, if we confine them in a small space, we diminish the muscular exertion and consequently the amount of food which is wasted by it. This is what is actually carried into effect by the use of hammels, stalls, and boxes, which, by the smallness of their space, prevent the animal taking an undue amount of exercise. In this, however, as in the former case there is a limit, for exercise to a certain extent is absolutely requisite, to the healthy performance of the functions of the animal. The object, therefore, of the careful feeder, is to reduce the consumption of food by these two necessary processes, to the smallest quantity consistent with the perfect health of the animal; and, I need scarcely say, that practice is here fully consistent with theory, for the speakers, one and all concurred in upholding the superiority of the methods adapted to secure these results; while they all condemn the use of open courts, which expose the cattle to the vicissitudes of the weather, and admit of active exercise.

Minor differences of opinion, however, exist as to which of the other methods of housing presents the greatest advantages, but those differences, as Mr. Elliot remarks in his observations, may be readily and fairly attributed to differences of climate and locality; for, while hammels which permit a certain amount of exposure to the weather, may be quite successful in a low and sheltered locality, they may be equally unsuited to an upland and cold district. The balance of opinion, however, is in favour of box feeding, which is well spoken of, by all those who have given it a fair and extended trial. It fulfils, in fact, all those conditions to which we just referred, and possesses the important practical advantages, of economy in the expenditure of labour in feeding, and the production of a manure of superior quality. The superiority of manure, though referred to by several speakers, is not discussed in detail; nor, so far as I know, are there at the present moment any satisfactory experiments to substantiate it, and though I think it probable, that a certain degree of superiority is produced, I should on theoretical grounds, hesitate to express a decided opinion. It is most desirable, however, that we should obtain facts which may enable us to do so, and I would suggest the subject as one which merits examination by careful experiment on the farm.

The second part of the subject, the method of feeding, was not gone into in such full detail, as it was one of the discussions of the previous year, but various observations fell from the different speakers which are deserving attention. Mr. Elliot insists particularly, on the advantage of giving a considerable variety of food; and this, which is his opinion founded on actual experience, is fully borne out by science, and is peculiary interesting to me, as I have more than once pointed out this, on the theoretical grounds, as a proper practice. Theoretically, the more we can vary the forms in which the elements of food are supplied to the animal, the more likely are we to promote active and healthy digestion, as well as to hit the proper proportion, in which these different constituents ought to be present.

It has been established, that there are two great classes of compounds which the food must contain; one of which including the saccharine and oleoaginous substances, form the true fuel of the animal body, of which one part goes to sustain its temperature, while another is laid up in the system in the form of fat, to be used as fuel in any emergency, to which the animal may at a future period be exposed. The other class, includes what chemists call the albuminous or proteine compounds, which go to the production of the true flesh or muscular fibre. Now the successful fattening of the animal can only be effected, by supplying it with food which contains both classes of constitutents in certain proportions. All the substances employed in feeding are not of this kind, and we require therefore to mix them together, so that the deficiencies of the one may be made up by the other. Mr. Christie has given us a curious illustration of this; on one ocassion, when beans were extremely cheap, he gave 6 lbs. each to a lot of sixty cattle, and he found that for several months they did well, but about the end of that period their coats became rough, they appeared not to relish their food, and some of them refused it entirely. Now, in this case, there was supplied to them a quantity of food, rich in albuminous, but deficient in saccharine or oily elements, and the proper proportion of these two being thus deranged, the functions of the animal were imperfectly performed; but no sooner did Mr. Christie reduce the quantity of bean meal to 2 lbs., and substitute for the remainder, 4lbs. of oilcake, than they immediately began to improve, and were sold in excellent condition. But even when the proper proportion is preserved, much advantage must be derived from varying their food, because the albuminous, oily, and saccharine matters, are not chemically indentical in all, and it is consistent with all we know of the phenomena of nutrition, to afford to the animal a supply of them in as varied forms as we can.

Mr. Elliot has touched on a subject of much importance, and which has engaged a good deal of my attention, in referring to the possibility of profitably employing the grain produced upon the farm in feeding. He has given an illustration from his own practice, of a case in which, after allowing a proper price for the turnips and grass consumed, he obtained 3s. per bushel for his oats, and 4s. for his beans, at a time when the market prices were 2s. 3d. and 3s. 4d. respectively.

ON THE MANAGEMENT OF GRASS LAND.

THE extract from the *North British Agriculturist*, in your August number, describes a management of grass land, which I have practised for more than 40 years, whenever I had pastures which did not feed level—first grazing them down as bare as possible with lean cattle and sheep; but as I have no faith in the general belief, that the depasturage of grass land is sufficient to increase, or even to keep up its fertility, it has been my practice, after giving them two or three strokes with a set of heavy harrows and collecting the fog, to spread over them some kind of light manure that could be cast by hand from a seed tropper, or with a shovel from a cart tail, such as salt, soot, hen or pigeon dung, quick lime, or recently guano, proving purposely that which I believed best adapted for the requirements of the land so to be acted upon.

I have been a working farmer for near 50 years, and have, during that time, carefully noted that many pastures which were originally rich and productive, are now become very much deteriorated; and I believe it accords with common sense that it sould be so, when the flesh, bone, cheese, and butter which they have produced are taken into consideration, without any other renewal of the materials which yielded them, than what has been obtained from the atmosphere.

Further, acting on this principle, I carefully collect all the cow and horse droppings from my pastures every 14 or 20 days during the summer, cart them to hedge side, waste bank, or marl-pit, and there mix them with such earth as is at hand, leaving them to ferment till winter, when they are generally in a fine state for re-carting upon those grass lands most in want of melioration.—*Francis Cope, Bromley Hurst, Staffordshire, Aug. 22, 1852.*

THE ORIGINAL HAYMAKER.—The hare is only noticed for its extreme timidity and watchfulness, and the rabbit for the burrows which it excavates for its own habitation, and as a nest for its young; but there is an animal related to them, the rat-hare, which is gifted by its Creator with a very singular instinct, on account of which it ought rather to be called the haymaker, since man may or might have learned that part of the business of the agriculturist, which consists in providing a store of winter provender for his cattle from this industrious animal. Professor Pallas was the first who described the quadruped exercising this remarkable function, and gave an account of it. The Tungusians, who inhabit the country beyond the lake of Baikal, call it Pika, which has been adopted as its trivial name. These animals make their abode between the rocks, and during the summer employ themselves in making hay for a winter store. Inhabiting the most northern districts of the old world, the chain of altaic mountains, extending from Siberia to the confines of Asia and Kamtschatka, they never appear in the plains, or in places exposed to observation; but always select the rudest and most elevated spots, and often the centre of the most gloomy, and at the same time humid forests, where the herbage is fresh and abundant. They generally hollow out their burrows between the stones and in the clefts of the rocks, and sometimes in the holes of trees. Sometimes they live in solitude, and sometimes in small Societies, according to the nature of the mountains they inhabit. About the middle of the month of August these little animals collect, with admirable precaution, their winter's provender—which is formed of select herbs—which they bring near their habitation, and spread out to dry like hay. In September they form heaps or stacks of the fodder they have collected under the rocks, or in other places sheltered from the rain or snow. Where many of them have laboured together, their stacks are sometimes as high as a man, and more than eight feet in diameter. A subterranean gallery leads from the burrow, below the mass of hay, so that neither frost nor snow can intercept their communication with it Pallas had the patience to examine their provision of hay, piece by piece, and fount it to consist chiefly of the choicest grasses, and the sweetest herbs, all cut when most vigorous, and dried so slowly as to form a green and succulent fodder; he found in it scarcely any ears, or blossoms, or hard and woody stems, but some mixture of bitter herbs, probably useful to render the rest more wholesome. These stacks of excellent forage are sought out by the sable hunters, to feed their harrassed horses, and the (Jakutes) natives of that part of Siberia pilter them, if I may so call it, for the subsistence of their cattle. Instead of imitating the foresight and industry of the pika, they rob it of its means of support, and so devote the animals that set them so good an example to famine and death.—*Kirby's Bridgewater Treatise: Bohn's Scientific Library.*

NEW FLAX DRESSING MACHINE.

The Scientific American of the 17th contains a description and engraving of a newly patented machine for dressing flax, hemp, &c., which it is thought will prove superior to all former of L. S. Chichester, No. 57, Chambers-street, New York:—"The principle of the machine's action is a very simple one, and embraces a most excellent feature. It is well known that if we take a few threads of flax and hold them with the finger and thumb of both hands at a small distance apart, and give them a rubbing doubling up and down motion, we can break and rub off the woody parts of the fibrous of the flax, in a more perfect manner, and with less injury to the textile parts, that is, making less tow than by any other method. This machine is constructed to carry out and operate upon this

principle of action. * * * As the flax is moved foward between the cylinders, it is rubbed and twisted, or angled, between the slats with considerable pressure, and thus the pith or woody parts of the flax are broken and separated from the fibrous parts without tearing the fibres. The flax is carried from the first pair of cylinders between the central pair of feed rollers, and then carried between the other pair of cylinders and acted on in the same manner, and is then discharged on the back table or endless apron. It makes very little tow, and produces beautiful broken flax. It can be operated either by hand, horse, water, or steam power. We cannot say how much flax in an hour or a day: that depends a great deal upon the way in which a machine is attended, and the power applied to operate it; it can at least break one ton per day. We have seen the machine operate, and it produced very excellent work."

HINTS ON PAPER-HANGING.

Many a fever has been caused by the horrible nuisance of corrupt size used in paper-hanging in bed rooms. The nausea which the sleeper is aware of on waking in the morning, in such a case, should be a warning needing no repetition. Down should come the whole paper at any cost or inconvenience; for it is an evil which allows of no tampering. The careless decorator will say that time will set all right—that the smell will go off—that airing the room well in the day, and burning some pungent thing or other at night, in the meantime, will do very well. It will not do very well, for health, and even life, may be lost in the interval. It is not worth while to have one's stomach impaired for life, or one's nerves shattered, for the sake of the cost and trouble of papering a room, or a whole house, if necessary. The smell is not the grievance, but the token of the grievance. The grievance is animal putridity, with which we are shut up, when this smell is perceptible in our chambers. Down should come the paper; and the wall behind should be scraped clear of every particle of its last covering. It is astonishing that so lazy a practice as that of putting a new paper over an old one should exist to the extent it does. Now and then an incident occurs which shows the effect of such absurd carelessness. Not long ago a handsome house in London became intolerable to a succession of residents, who could not endure a mysterious bad smell which prevaded it when shut up from the outer air. Consultations were held about drains and all the particulars that could be thought of, and all in vain. At last a clever young man, who examined the house from top to bottom, fixed his suspicions on a certain room, where he inserted a small slip of glass in the wall. It was presently covered, and that repeatedly, with a sort of putrid dew. The paper was torn down, and behind it was found a mass of old papers, an inch thick, stuck together with their layers of size, and exibiting a spectacle which we will not sicken our readers by describing.—*Dickens's Household Words.*

LOSS ON STOCK DRIVEN TO MARKET.—Several days used fomerly to be occupied in driving to the London market from the county of Norfolk only, and it was found that on an average, a sheep lost 7lbs weight, and 3lbs. inside fat, and a bullock 28lb. These weights were ascertained by a series of trials, average animals being killed and weighed on the farm, and compared with the weights of similar animals when slaughtered in London. This difference of weight was waste, entirely lost to everybody. On the quantity of stock annually sent out by Mr. Hudson, of Castle Acre, a distinguished Norfolk farmer, this loss was equivalent in value to upwards of £600 a year, nearly the whole amount of which now finds its way to the market, as the stock are put into the trucks in the morning, and reach London in the afternoon without fatigue.—*Caird's Agriculture.*

A HEALTH TO GREEN ERIN, OR THE EMIGRANTS.

[The following, from the *Courant*, is from the pen of the variously accomplished sheriff of Ayrshire.]

TUNE—*Coolin.*

A health to green Erin we shout to her shore.
A health to the Land we shall never see more;
The Land of the cordial, the bright, and the brave.
The Land of our Cradle—we hop'd of our Grave.

But Fate closes round as her gathering gloom,
And Sickness and Famine have uttered our doom;
No promise of Hope through the long-coming years,
No future but wand'rings, and sorrows, and tears.

To far distant countries and climates we roam;
Our dust will not sleep with our fathers at home;
The ear of the stranger will hear our last sigh,
No heart of lov'd Erin will mourn when we die.

O green do the hills of sweet Erin arise;
O bright are her waters, and soft are her skies:
We seek the wild forest so tangled and don,
The boundless Savannah—the brain-scorching sun.

The last hope is blighted—the struggle is o'er;
For ever we part from our dear native shore;
While tears—gushing tears—our deep agony tell.
O Land of our Fathers!—sweet Erin farewell.

DISTRICT AGRICULTURAL SHOW FOR THE DISTRICTS OF ST. FRANCIS AND THREE RIVERS.

NOTICE is hereby given that the days appointed for holding the District Show at Melbourne, are changed from the 6th and 7th October next, to the 13th and 14th days of the same month, the Show for the District of Montreal falling on the former days.

The Ploughing Match will be held on the second day, 14th.

There will be an ordinary at 5 p. m., of the 13th at Hardy's Hotel, in Richmond, of whom, or of the Committee, tickets may be had,.

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